Quality Air Force in the 21st Century

Technology & Innovation

1996 Quality Air Force Symposium

19970123 001

Proceedings

Preface

The Air Force's commitment to the implementation of Quality is more focused now than ever before. As the 21st Century arrives, our vision continues to be the light house that guides our every action. With our focus on building a Quality Air Force to improve the overall operational performance, we develop plans to forge our future. Application of continuous improvement in our daily operations ensures we are marching in unison but flexible enough to react to our environment.

This is the *1996 Quality Air Force Symposium Proceedings*. Our theme this year is *Quality Air Force in the 21st Century; Technology and Innovation*. You are already using technology and innovation to make quality a way of life and move the AF closer to its vision. I encourage you to read all the works included here. They represent the thinking and doing of members across the AF in these two areas.

This selection of papers is only a fraction of those submitted for consideration. The selection process had reviewers from locations around the world, active and reserve, civilians, enlisted, and officers, MAJCOMS, Wings, Groups, and Squadrons reading and evaluating papers. Their task was to select the best submission which had the broadest interests for the AF at large. For those who where part of this process, our sincere thanks for your hard work and dedication.

These Proceedings are dedicated to you, the reader of this work. We hope this Symposium challenges you to continue applying quality to your daily work. Remember, you are Air Force people building the world's most respected air and space force.

Jose A. Martinez, Lt Col, USAF
Chair, Program Committee

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	Oct 1996	Symposium Proceedings, 1996

4. TITLE AND SUBTITLE

1996 Quality Air Force Symposium Proceedings

Quality Air Force in the 21st Century: Technology and Innovation

5. FUNDING NUMBERS

None

6. AUTHOR(S)

Various Authors

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Air Force Quality Institute
625 Chennault Cirle
Maxwell AFB, AL 36112-6425

8. PERFORMING ORGANIZATION REPORT NUMBER

Proceedings 96

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Air Force Center for Quality and Management Innovation
550 E Street East
Randolph AFB, TX 78150-4451

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

Proceedings 96

11. SUPPLEMENTARY NOTES

This compendium of papers was published for the QAF Symposium held October 15-17, 1996 at the Montgomery Civic Center, Montgomery, Alabama. Sponsored by the Air Force Quality Institute.

12a. DISTRIBUTION AVAILABILITY STATEMENT

UL (Unlimited)

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

The 1996 QAF Symposium Proceedings contain 43 papers written by Air Force personnel on various aspects of quality and abstracts from 19 team presentations. Paper topics include: A Team for the Future: Success in the Cheyenne Mountain Complex; Transforming a "Left-Brain" Organization into the 21st Century; Unit Self Assessment; The Air Force Reserve Funds Control Vission; Using New Technology to Collect and Spread Best Practices in Air Combat Command; Log Off; TQM: Manufacturing Vs. Services; It's Time to Think About Values First; Using Technology to Enhance Organizational Analysis; Turning the Air Force Into A Learning Organization; The Integrated Annual Planning Model; 147th Communications Flight Worklaod Control System; Statistical Process Control: The Link to Quality In Daily Operations; Into the 21st Century with Strategic Planning; Organizational Change Done Structurally; Certification: Ensuring Quality is Deployed to the Lowest Level; Using the Integration Definition for Function Modeling in Air Force Work Methods Improvement; Innovation in Rewards and Recognition: A Systems Approach; Quality Approach: The Right Start for a USA; Local Innovation with Demmings Fouteen Points; Chaos Theory and the Future of Stategic Planning; Project Quest; Leadership and the Technology Factor; Air Force 2025; Cultural Change and Organizational Development; Action Workout; Less Education and More Training; Action Workout; Surveys; CyberGuard; Experiential Learning; and many other topics.

14. SUBJECT TERMS

Quality Air Force, QAF, Total Quality Management, TQM, Empowerment, Teams, Surveys, Customer Service, Process Action Teams, PAT, Demming, Groupware, Team Building, Feedback, Gap Analysis, Metrics, Quality Tools, Customer Satisfaction, Leadership

15. NUMBER OF PAGES

452

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

Table of Contents

Presented at the Symposium.

*Presented at the Symposium.

SPECIAL EVENTS

CHIEF OF STAFF TEAM EXCELLENCE AWARD TEAM ABSTRACTS

A Team For The Future:
Successes In The Cheyenne Mountain Complex System Program Office Pave The Way To The 21st Century

Capt Carlin R. Heimann

Capt Heimann has served in Aircraft Maintenance at Little Rock AFB, AR, and in the Acquisition field at Hanscom AFB, MA. In addition to his normal duties, Capt Heimann is an experienced Quality facilitator and instructor, and has conducted several unit QAF assessments. He is currently assigned to the C/KC 135 program office at Tinker AFB, OK. Capt Heimann is married and has two children.

A Team For The Future:
Successes In The Cheyenne Mountain Complex System Program Office Pave The Way To The 21st Century

Capt Carlin R. Heimann
Cheyenne Mountain Complex System Program Office
Electronic Systems Center

Abstract

The Cheyenne Mountain Complex System Program Office (CMC SPO), has greatly benefited from unique initiatives to better the way we do business. These initiatives are implementation of the System Engineering Integration and Test Team (SEIT), a new customer satisfaction evaluation process, and the Software Technology Roadmap. The principles behind these new processes are simple and can be used by a multitude of organizations throughout Government and industry.

The three SPO initiatives differ in their approaches, but have the same result in taking giant steps to enhance the SPO, which was recently selected as the top Program Executive Officer program at the Electronic Systems Center. The SEIT, part of the CMC SPO, is a "team within a team" - a unique type of integrated product team that does more for customer involvement, communication, and information sharing than has ever before been seen in the CMC SPO. The new customer satisfaction evaluation process brings the SPO a real-time, face-to-face assessment of our customers' feelings about how the SPO is satisfying customer needs. The Software Technology Roadmap will give the CMC SPO and other Government, industry, and research organizations the ability to access a single source for state-of-the-art information on software technology.

Any organization can use these concepts to reap the same benefits the Cheyenne Mountain Complex SPO has gained. The principles are simple, although implementation takes hard work and dedication. Applying the necessary energy to build on these concepts can allow any organization to move toward a true quality environment.

I. Introduction

Over the past two years and into today, the Cheyenne Mountain Complex System Program Office has made substantial changes to the way it does business. Three improvements have especially benefited our team, our customers, and our suppliers. These initiatives are the System Engineering Integration and Test Team, the customer satisfaction evaluation process, and the Software Technology Roadmap. They are discussed below, with suggestions on how other organizations can apply these approaches to their own processes and products.

II. Background: The Cheyenne Mountain Complex System Program Office (CMC SPO)

The CMC SPO acquires, tests, and sustains command, control, and communications equipment and software for the Cheyenne Mountain Air Station in Colorado Springs, Colorado. The CMC SPO provides similar support to related operating sites worldwide. The systems we provide aid the users in supplying air, space, and missile warning data for North America to National Command Authorities to formulate viable threat responses.

The systems we develop and sustain are part of an international network of systems that fall under the umbrella of the Integrated Tactical Warning and Attack Assessment (ITWAA) structure. The CMC SPO Director coordinates activities of the ITWAA programs by chairing an ITWAA O-6 Action Group. This action group meets quarterly and reviews activities and formulates plans for the advancement of systems within the ITWAA structure.

The CMC SPO is managed at the Electronic Systems Center (ESC), Hanscom AFB, MA, but has several operating locations. The program director and the primary acquisition functions are at ESC. The hardware and software maintenance of the CMC systems, as well as the SPO integration and test activities, are managed via teams in Colorado Springs. A small team is located at Offutt AFB, Nebraska, to support the alternate missile warning center located there.

III. The Heart of it All: A Team Within a Team

Background. In 1994, due to inadequate test resources and schedule, the CMC SPO accomplished a significant program replan. During this replan, SPO leadership as well as guidance teams from higher headquarters recognized deficiencies in integration, configuration management, and test management. The operator, developer (CMC SPO), and the Under Secretary of the Air Force for Acquisition jointly decided to solve these problems by establishing a multi-agency integrated product team to provide teamwork, focus, discipline, and accountability. The result was the formation of the System Engineering, Integration, and Test Team (SEIT).

Although initially meant to be a temporary organization to guide the CMC SPO through the remainder of the major acquisition deliveries, the SEIT has become much more than that. The SEIT provides a unique look at integrated product teams and how these teams can benefit an organization. In fact, the SEIT methodologies provide a model for organizations of any type to emulate and gain the teaming structure necessary to thrive into the 21st Century.

How the SEIT is organized. The SEIT is the hub of the Cheyenne Mountain Complex SPO. Although the SEIT administratively falls under the CMC SPO, it is comprised of members from all primary stakeholders in the CMC community. This includes members from the CMC SPO, the Customers (Air Force Space Command (AFSPC), North American Aerospace Defense Command (NORAD), United States Space Command (USSPACECOM), forward using agencies), the operational testers (Air Force Operational Test and Evaluation Center (AFOTEC)), and the suppliers (prime contractors). The SEIT is led in Colorado Springs by a Director who reports to the CMC SPO Director. The SEIT has four sub-teams that address scheduling, technical disconnects, baseline management, and test management. Since the SEIT is part of the CMC SPO, all full-time members of the SEIT are CMC SPO personnel. The other member agencies provide people on a part-time, augmentee basis (this concept is described in more detail below).

What Does the SEIT bring to the CMC SPO? The SEIT does for the CMC SPO what every organization needs to succeed. It provides the customers an avenue to look "inside" the CMC SPO. It opens channels of communication and provides broad access to information. The SEIT provides simplicity in a highly complex organization. It provides centralized control and decentralized execution of SPO activities. And ultimately, the SEIT supplies the all-encompassing member input and decision buy-in that productive integrated product teams enjoy.

The Customer as Team Member and More. Here's a unique twist to the typical integrated product team. As depicted in Figure 1, not only is the customer (the operational user) a team member, but the SEIT actually "reports" to a flag officer (the Cheyenne Mountain Operations Center Commander, or CMOC/CC) in the customer community. This creates a unique relationship. Although the SEIT is part of the CMC SPO, the SEIT briefs the CMOC/CC weekly and creates action plans based on input from those meetings and from the CMC SPO Director's guidance. Thus the customer plays an integral role in daily activities of the CMC SPO instead of just a periodic "quality checker" role as is the case in most organizations. Because of this, the CMC SPO has a stronger relationship with its customers than it ever had in the past.

Communication and the "Thread" Concept. What makes the SEIT the true heartbeat of the CMC SPO is the direct avenues of communication it provides within and outside of the SPO. The SEIT accomplishes this through their "Thread" concept. The CMC SPO Director assigns full-time SEIT members from the SPO to run daily operations. Additionally, the SEIT has augmentees, or "threads", as part-time members from all other stakeholder

SEIT RELATIONSHIPS
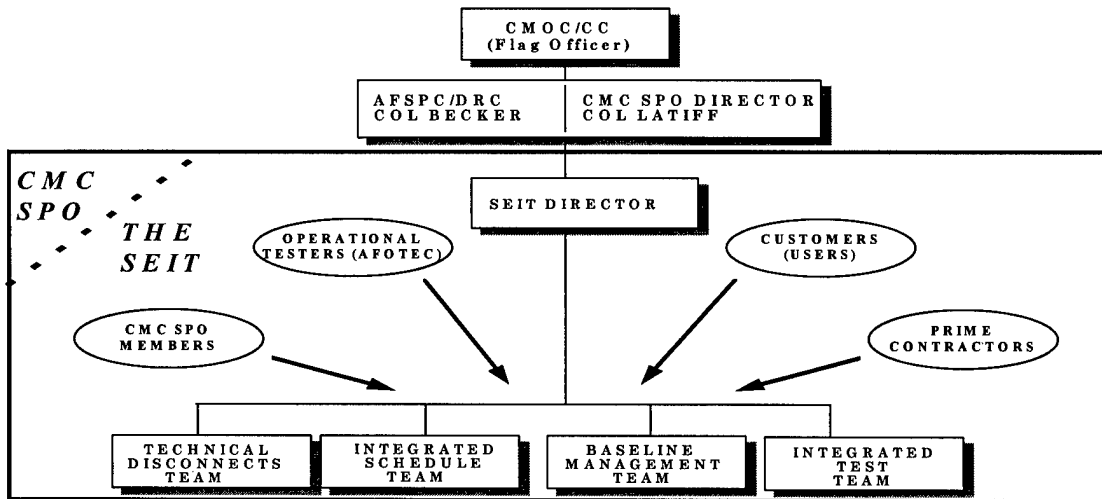
Figure 1: SEIT Relationships

organizations (previously mentioned), as well as within the primary mission areas within the CMC SPO. As Figure 2 depicts, these threads are real people who are the points of contact between the SEIT and their respective organizations. They are the people who provide input, aid in decision-making, and ultimately provide the conduit for "buy-in" from their organizations for the decisions and actions of the CMC SPO. They are also the people held accountable to ensure all stakeholders have appropriate information and get their opinions heard. The thread concept has been the major contributor in taking the best courses of action possible based on the concerns and ideas of the entire stakeholder community.

Common Link in a Highly Complex Organization. The SEIT replaces complexity with simplicity. The CMC SPO has numerous organizational elements and operating locations, many customers with varying requirements throughout the world, and a technically complex weapon system requiring intricate engineering and testing procedures. This type of environment is subject to chaos if not managed properly. The SEIT adds order to this complexity. As Figure 3 depicts, prior to the SEIT, lines of communication and coordination with all stakeholder agencies resulted in an overly complicated process and important data was lost or not communicated to the appropriate agencies. Figure 4 shows the post-SEIT structure. Now the SEIT provides a central communication hub for all involved agencies. Technical problems, innovative ideas, testing processes, schedule tracking, integration actions, and other data all flow through the SEIT, with all stakeholder organizations working from the same data through use of their "threads" to the SEIT.

Broad Access to Information. Every organization strives to have a common database of information to avoid confusion. The SEIT provides that common database for the CMC SPO and other involved organizations. The primary way the SEIT accomplishes this is through the "thread" concept already discussed. Additionally, the SEIT uses modern technology to ensure everyone is working from the same pool of information. The SEIT

SEIT Threads

USERS

JS/J36 STRATCOM SP Staff

NORAD Staff

N/SPJ6N

N/J5RP

N/SPJ6C SPJ5C

21 SW

721 SPTG AFSPC/SC AFSPC/DR AFSPC/DO CMOC
& others

ESC

AFOTEC

Other ESC/SR
Laurie Reid

CMC
SPO

Space ML
LtCol
Heffner

Air ML
LtCol
Ruminski

Missile ML
LtCol Paling

Mr Soares Capt Frasier LtCol Allen Maj Cooper CDR Heatley
Lt Col Currie LtCol Duggan Maj R. Smith Maj Lawrence

SPADOC Capt
Angus

Qg Capt
Rasmussen

APC Capt
Ludwinski
Capt
St. John

CCPDS Maj
Hutchison

SCIS Capt
Manas

Maj Kirshenbaum — Det 4 AFOTEC

HQ AFOTEC

AF/TE

OSD/DOT&E

Integrated
CMU Test Management Team
Maj Playle

Technical Disconnect
Resolution Team
Maj McKernan

SEIT
Mr Steele/Maj Matson

Integrated
Technical Schedule Team
Maj Smith

Baseline
Management Team
Capt St. John

Schedule IPT
Mr Deloach

SWSC

Col Case

SRSC
SRSM
SRSQ
SRSS
SRSW
SRSX

Ms
Brock

Ms Frazier

SSSG/SDCE

SSSG

SDC
June Taylor

MWSSS/SDWSE
Mr Martin

Mr Schulte
Mr Sathre

Mr Foster
Mr Greenhalgh

Mr O'Dell
Mr Robinson

Mr Mottola
Mr Haney

Mr Fontanez
Mr Bray

Mr Mitchell
Mr Bradshaw

Lockheed-
Martin

Kaman TRW GTE E-Systems Loral

PRIME
CONTRACTORS

Figure 2: SEIT Threads

PRE-SEIT COMMON
DATA FLOW

AFSPC
USSPACECOM
NORAD
OTHER USERS
AFOTEC
CMC SPO
AIR WARNING
AIR WARNING
CONTRACTOR
CMC SPO
SPACE CONTROL
SPACE CONTROL
CONTRACTOR
CMC SPO
MISSILE WARNING
MISSILE WARNING
CONTRACTORS

POST-SEIT COMMON
DATA FLOW

AFSPC
USSPACECOM
NORAD
OTHER USERS
AFOTEC
CMC SPO
AIR WARNING
CMC SPO
SPACE CONTROL
SEIT
CMC SPO
MISSILE WARNING
ALL
CONTRACTORS
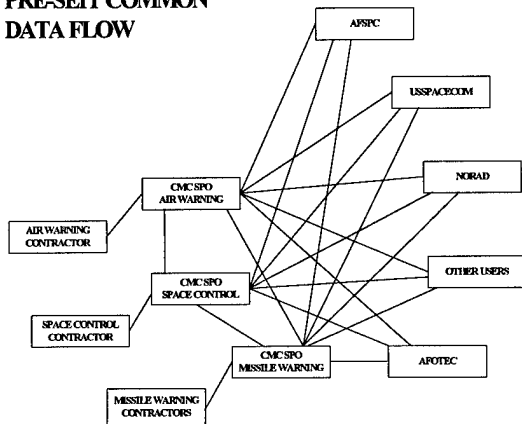
Figure 3: Pre-SEIT Common Data Flow
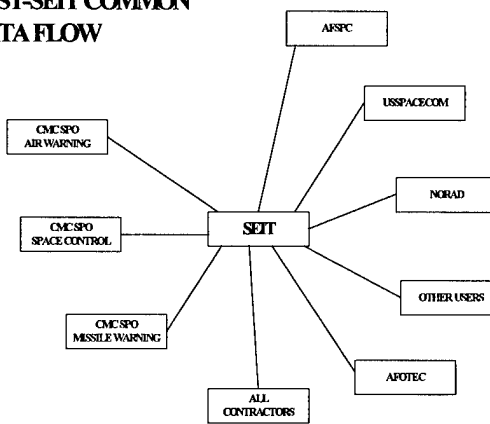
Figure 4: Post-SEIT Common Data Flow

maintains the master schedule of activities, available via an electronic network for agencies to view. This is the first time in history the entire operational, development, and testing has used a single integrated schedule of all events in Cheyenne Mountain. The SEIT also maintains a technical disconnect and change database for common use. Additionally, The SEIT authors technical baseline documents to ensure everyone agrees on system deliveries and performance. Any stakeholder in the CMC community who has questions about current information can tap into the SEIT to find the answers.

Team as "Honest Broker": Centralized Control, Decentralized Execution. Just as in wartime, the concept of centralized control and decentralized execution works well in the SEIT and the CMC SPO. The SEIT is the hub of activity for the CMC SPO and other stakeholders. The SEIT, with community input and agreement, devises and monitors action plans to solve problems and implement ideas. The CMC SPO Director and the CMOC/CC use the SEIT as their control point for ensuring appropriate actions are taken to satisfy mission needs. However, the SEIT does little action plan execution itself. The execution takes place within the mission elements of the CMC SPO, the prime contractors, and other organizational elements necessary to carry out the action. Because of this separation of control and execution, the SEIT can more freely act as an "honest broker" for the stakeholders, providing an objective assessment of schedule impacts, issues identification,. impact assessment and prioritization, and test resource allocation and management.

The Ultimate Team Environment. As the information above depicts, the SEIT has many benefits. It provides a structure for information management. It affords direct lines of communication for all stakeholders. It gives the entire CMC community a central database of information, as well as provides SPO and customer leadership a place to gain unbiased information. The SEIT also affords all stakeholders the opportunity to provide input and be a part of the decision-making process, which enhances "buy-in" of the decisions and actions. The SEIT does all this while adding simplicity to a very complex process. The SEIT concept is truly an integrated community approach demonstrating the very best in cooperation among the CMC SPO, suppliers, customers, and other stakeholders.

Recognition. In 1995, AFMC/IG recognized the SEIT as an outstanding performer for contributing to the success of the CMC SPO. At the same time, the Under Secretary of the Air Force for Acquisition (SAF/AQ) lauded the SEIT for its tremendous success in the program. Additionally, the Commander of the Electronic Systems Center chose the CMC SPO to give a briefing to the Secretary of the Air Force as an example of innovation within the acquisition community. SEIT successes were the driving factor behind the CMC SPO's selection as the top Program Executive Officer program at ESC for 1995. The ultimate recognition, though, has come from other organizations who have adopted the SEIT's practices and metrics of issues identification and resolution. The SEIT methodology for process and project control has become a prototype and has already spread to other AFMC programs. In fact, the SEIT has now expanded its roles to the ITWAA level and supports those programs and the O-6 Action Group as it supports the CMC community.

A Model for Anyone. Figure 5 shows an generic organizational model of the SEIT structure that any organization can benefit from. The key to success in this structure is to maintain discipline in the use of the integrated team as the hub of communications and activities for the organization. The organization must ensure that all stakeholder agencies are represented and that these agencies have designated, accountable people as "threads" to the integrated team. By applying this model, organizations can reap the benefits that the Cheyenne Mountain Complex System Program Office has already realized. In addition to advances in organizational structure and processes, we are also implementing a new way of determining our customer's satisfaction with our products and services.

THE ORGANIZATIONAL MODEL
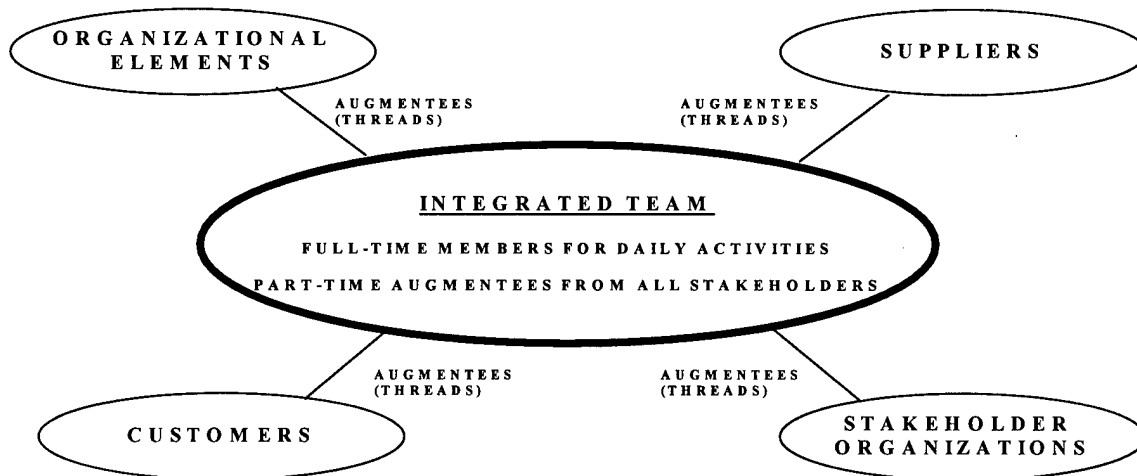
Figure 5: A Generic Organizational Model of the SEIT Concept

IV. Evaluating Customer Satisfaction: From Paper to People

The Need for Consistent Customer Evaluation. The CMC SPO has a good working relationship with our customers. Daily interaction and feedback are good indicators of how the SPO is progressing on a day-to-day basis. However, the SPO needs to be aware of the bigger view the customer has of our products and services. Therefore, the SPO introduced a new process to provide this broader information and to replace a survey process that was not working.

Death By Survey. Over the past few years, military organizations seems to have become reliant on paper surveys to determine if their customers are satisfied with the organization's products and/or services. We have all had to complete surveys which ask for feedback on our satisfaction with some process or product. And in doing so, we have all seen surveys that are too lengthy, poorly worded, or just plain confusing. These surveys we have thrown in the trash, completed half-heartedly just to get done with it, or sent back a reply stating how poor the survey was. And these are just some of the problems.

Numbers Can Lie. Most surveys are based on a numerical system for the customer to "grade" the supplier's performance. We all know from history and from common sense that numbers don't tell the whole story. They don't reveal roots of problems, give potential solutions, or provide us a big picture of how the customer feels about our work. If done properly and consistently, numerical scoring can be a good indicator of long-term trends, but does not aid us to make immediate improvements.

8

Paper Surveys Just Don't Give us What We Need to Improve. In general, customers don't complete long surveys, and short surveys don't provide detail necessary for us to really know how our customers feel. Questions can be misinterpreted. Customers can get frustrated with the survey process. Organizations can't read "body language" from a paper, nor can they get a "feeling" for the customer's opinion. In other words, we need more than what paper surveys can give us.

Specific Problems in the CMC SPO. The CMC SPO has, for a few years, been sending paper surveys every six months to our primary customers. Although the customers have completed the surveys in full, we have had to rely on a systematic follow-up process to determine what the customer's real concerns were. Beyond this, two other problems hindered the success of the survey process. First, due to turnover in the customer's organization, different people with different interpretations of the questions have answered successive surveys. Second, although the surveys have asked for customer opinions for action for the previous six months, customers very frequently base their answers on actions and products from the past few years. These problems have resulted in an inconsistent and unreliable customer feedback process. So what have we learned from all this? We've learned that surveys can be a useful tool if done properly, but they must be qualified with face-to-face talks with the customers.

The CMC SPO Solution. The CMC SPO has very recently initiated a new customer feedback process which we believe will solve the problems of the previous survey-based process. The new process, depicted in Figure 6, is based on current information, self-evaluation, face-to-face discussions with the customers, and a focus on how the customer feels about the process and products.

The Process. The foundation of the process is a face-to-face meeting with the customer. This meeting takes place quarterly as part of the normal Program Management Reviews (PMRs) we have with our customers. One week prior to this meeting, we give the customers a document which provides an outline, as guidance, of the minimum areas to be covered
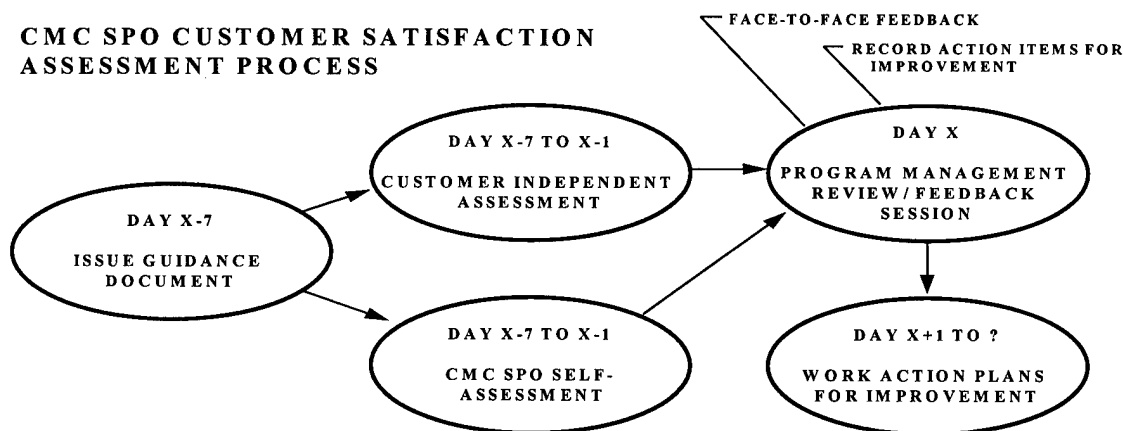
Figure 6: The New CMC SPO Customer Satisfaction Evaluation Process

during the feedback session (the PMR). This gives us and the customers a tool on which to base our discussions at the PMR. During the week prior to the PMR, the CMC SPO performs a self-evaluation of our work and products for the previous quarter year based on the guidance document. When we enter the feedback session at the PMR, the SPO has a self-assessment and the customers have a performance assessment, both very current and based on the same guidance criteria. This provides for an organized, logical discussion of issues, and ultimately provides the foundation to fix problems and improve processes. The SPO can then use the feedback session to focus not only on the formal assessment, but the intangible feedback one cannot perceive from a paper survey.

A Positive Outlook. The new feedback process is still in its infancy. However, we at the CMC SPO have learned from past experience and expect the new process to give us important information to help us improve and satisfy the customer well into the next century. While we're trying new ways to evaluate customer satisfaction, we are also aiding in developing the future processes of software technology access and use.

V. The Software Technology Roadmap: A Model for Process and Product Improvement

The Software Technology Roadmap. The Software Engineering Institute (SEI) at Carnegie Mellon University in Pittsburgh, PA, has recently begun an effort to enhance the way the Government and industry approach software implementation in weapon systems. The product of this effort will be the Software Technology Roadmap.

Definition. The Software Technology Roadmap will provide the Government and industry with a reference document which will list and define state-of-the-art software technologies broken into 14 technical areas. This document will describe technology attributes such as risks, costs, benefits, limitations, trade-offs, and issues. It will group problems with potential technology solutions as well as provide sources and attributions for all its data.

Building the Roadmap. The SEI is undergoing a six-month process to collect the latest information on software technology from Government, industry, and academic sources. The SEI will conduct technology workshop to share and gather information. Once they have all the information necessary, the SEI will author the Roadmap, and widely distribute the document.

Advantages of the Roadmap. As a reference document, the Roadmap will provide a single source of information for many applications. Government program offices can reference it for programmatic decisions, industry can use it for application in proposals, and researchers can reference it for research and development investment decisions. This consolidated source of technology information has never before been compiled in the software arena. The Roadmap will represent an impartial look at the latest software technologies and potential applications; an objective view rarely found when attempting to

reference independent technology studies and sources. Possibly the greatest advantage to compiling this comprehensive guide is its ease of use. Government and industry will now have a single document to reference to obtain a broad view of the latest technologies, with further detail attainable via the sources cited in the Roadmap.

Tie-in to the CMC SPO. The CMC SPO is a member of the Command, Control, Communications, and Computer Evolution Concept Action Group (C4E CAG) which is chaired by the SPO's customer organizations (NORAD, USSPACECOM, AFSPC). The purpose of the C4E CAG is to study alternatives and derive strategies for future evolution of North American warning and attack assessment systems. The C4E CAG was chosen to work with the SEI in developing and testing the use of the Software Technology Roadmap. The CMC SPO, as part of the C4E CAG, will be a "prototype" organization, testing the Roadmap during its development to ensure the usefulness and effectiveness of the concept.

The Process is Important. The lesson we can all learn from the actions of the SEI is applicability of this type of process to almost any widely-used function. Figure 7 depicts a model of how the Roadmap will be used in the software arena. The key concept is to spend up-front time, money and resources to compile a single, comprehensive source of information that can be used by numerous organizations to find relevant data. This concept can be used not only in technology-based applications, but any applications requiring broad research to find alternative solutions and ideas for future use. The SEI has laid the foundation, and the potential to expand this concept is enormous.
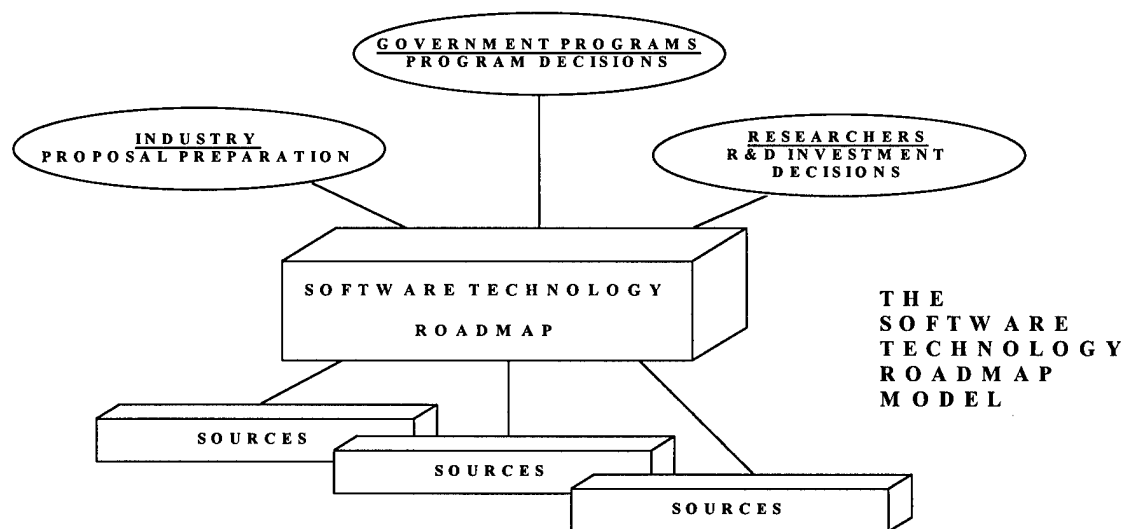
Figure 7: A Model of the Software Technology Roadmap Concept

11

VI. Conclusion

The initiatives discussed above are concepts that can be broadly applied to all types of support and operational organizations throughout the military and industry. The CMC SPO, its customers, and its suppliers have all reaped tremendous rewards from taking these steps of improvement. We expect to continue this success and expand on these and other initiatives in the future. Any organization that applies the principles discussed above will most certainly see the benefits we have discovered in the Cheyenne Mountain Complex System Program Office.

BIBLIOGRAPHY

1. Facsimile on Systems Engineering, Integration, and Test organization received from Lt Col Debra J. Matson, 19 Mar 1996.

2. Col Robert H. Latiff, "Systems Engineering, Integration, and Test Concept Orientation Briefing", Briefing to Secretary of the Air Force, Hanscom AFB, MA, 4 Dec 1995.

3. Capt Leroy Pedone, "C4 Evolution Initiative Update", Briefing given to Cheyenne Mountain Upgrade Interim Progress Review, Peterson AFB, CO, 22 Feb 1996

4. Robert Rosenstein, "Structured Survey of Software Technology: Mapping the Software Technology Roads Into the 21st Century - Project Briefing", Briefing to Government and industry organizations, n.d.

Transforming A "Left-Brain" Organization
Into The 21st Century

Ms Keely S. Beale

Ms Keely S. Beale is an employee of Sverdrup Technology, Inc., operating test contractor of Arnold Engineering Development Center at Arnold AFB, TN. She currently administers quality and other related programs from within the Plans and Programs branch of the organization.

Keely received her Bachelor of Science degree in Mechanical Engineering from the University of Tennessee. She has twelve years of experience in engineering-related work including turbine engine, rocket motor and wind tunnel testing, computer simulations, plume diagnostics, and project management.

Over three years ago, Keely defected from the technical arena and has since been working with the people side of the house, learning, using, and teaching tools and techniques to help guide the organization through the changes necessary to posture itself to effectively face the challenges ahead. In so doing, Keely has become certified as a facilitator of Dr. Stephen Covey's course on The Seven Habits of Highly Effective People and as a QAF Instructor/Facilitator. She also instructs and facilitates self-directed teams through their transition to this new type of organizational management.

Transforming A "Left-Brain" Organization Into The 21st Century

Ms Keely S. Beale
Sverdrup Technology, Inc., AEDC Group
Arnold AFB, TN

Abstract

Arnold Engineering Development Center (AEDC) provides technologically advanced flight simulation testing for a wide variety of military and commercial customers. Providing this service requires a workforce highly skilled in many technical, or "Left-Brain," logical disciplines. Budget reductions and other external challenges in the defense industry are necessitating AEDC's transformation from a scientific, industrialized workforce into an organization capable of surviving in the Information Economy of the 21st century. Key to this transformation is the connection of "Left-Brain" logic with "Right-Brain" creativity. Many tools are aiding in the effort, but the greatest progress is being made through the facilitated group process and the DesignShop™. Process facilitation removes the barriers to an individual's or group's work by managing all realms of activity within any work session as a unified whole. The DesignShop is a specific application of process facilitation in which participants are facilitated through a rigorous group problem-solving process. Knowledge Workers facilitate the process by supporting the effective application of information and knowledge. AEDC's goal is to transform the workforce into Knowledge Workers who integrate process facilitation and DesignShop methods into their everyday work, connecting the Left and Right Brains within the organization, and preparing AEDC to face the challenges of the next decade.

AEDC and Its People

Arnold Engineering Development Center (AEDC) is the largest and most technologically advanced flight simulation testing facility in the United States. Located on Arnold Air Force Base in beautiful Middle Tennessee, AEDC operates some 50 aerodynamic and propulsion wind tunnels, rocket motor and turbine engine test cells, space environmental chambers, arc heaters, ballistic ranges, and other specialized test units. Flight conditions from sea level to space and from subsonic speeds to well over Mach 20 can be simulated in AEDC's test facilities for a wide variety of military and commercial customers, including the U.S. Air Force, Army, Navy, the National Aeronautics and Space Administration, the Federal Aviation Administration, private industry, allied foreign governments, and U.S. government and educational institutions. AEDC's mission is to support the development of aerospace systems by testing hardware in facilities that simulate flight conditions. The Center also conducts a research and technology program to develop advanced test techniques and instrumentation and to support the design of new test facilities. AEDC's product is information in the form of raw and reduced test data, analyzed data, reports, drawings, computer simulations, technical papers, etc. This information has contributed to the development of nearly every top national aerospace program since the 1950's, including the manned space program, intercontinental ballistic missile systems, high-performance aircraft systems, various satellites, the B-1 and B-2 bombers, the Navy F/A-18 E/F, and more recently, the Lockheed F-22 and its Pratt & Whitney F119 jet engine, and the Boeing 777 with both its Rolls Royce Trent 800 and Pratt & Whitney 4084/90 power plants.

Because of the highly technical nature of the work done at AEDC, the workforce must possess the technical expertise and skills necessary to effectively utilize AEDC's test facilities. A complement of nearly 3,000 people carry out the test mission employing education received in mechanical and electrical craft specialties, engineering and scientific disciplines, other technical areas, administration, and management/supervision. Upwards of 75 percent of the workforce is highly skilled in technical areas and the scientific methods learned through many years of education and application. This scientific workforce majority has resulted in an organization dominated by Left-Brain logic, not only in the testing arena, but also in the management arena.

External Challenges

Since its dedication by President Harry Truman in 1951, AEDC has provided high quality testing support using tried-and-true scientific, logical, Left-Brain methods, and will continue to do so. Recently, however, many external challenges threaten AEDC's vision of being "the test center of choice for our customers, the workplace of choice for our people,

---

and a model of environmental excellence." Almost everyone is familiar with recent defense budget cuts resulting in downsizing and restructuring within many government organizations. AEDC's workforce has not been immune. Aging test facilities require upgrades and maintenance, but available funds are limited. Environmental laws require compliance in many new areas. The "end" of the Cold War has reduced the level of defense-related weapons system testing requested by customers. The growing European aerospace industry poses an economic threat through competition for customers. And, because of the total quality movement, customers are requiring a more integrated team approach to the entire test process.

AEDC could have chosen to do nothing in the face of these challenges and possibly fallen victim to base realignment or even closure. Instead, leadership chose the path of Transformation - not simply a "do more with less" attitude - a metamorphosis into a changed state of being. Facing these challenges is requiring AEDC to re-think it's Left-Brain management approaches. AEDC's people are learning new ways of managing themselves and their work to become a viable 21st century knowledge-based organization capable of meeting the challenges ahead in the new Information Age.

A New Challenge

As a product of the Industrial Age since dedication 45 years ago, AEDC's organizational maturation, combined with the scientific, logical nature of the workforce allowed the characteristics of an industrial society to readily permeate its culture. Shifting from a mindset focused on the industrial characteristics listed in Table 1 to one focused on the characteristics of an Information Economy is not easy. Compounding the problem is a strong tendency to categorize the programs necessary to successfully shift the culture as peripheral to the organization's "real work." The Center's new challenge, therefore, is connecting "Left-Brain" logic with "Right-Brain" creativity necessary to successfully change the culture to one which embodies the characteristics of an Information Economy. Such a change will require opening up to new ways of working and transforming the workforce into a knowledge-based organization - one that integrates the relatively new characteristics of the Information Age into its culture. Then AEDC may truly be capable of handling the opportunities of the coming decade.

Meeting the Challenge

Many programs are ongoing to assist in the transformation. AEDC teaches Dr. Stephen Covey's *The Seven Habits of Highly Effective People* to help people shift from a state of independence to interdependence. Teamwork is continuously emphasized through the Quality Air Force philosophy. Many areas within the organization are restructuring into self-directed work teams, and many business processes are managed through teams. AEDC teams have the opportunity to build teams through the physical challenges presented by the Teamworks Adventure "ropes" course. Communication channels are opened through town meetings and the commander's hotline. And the list of activities goes on.

Table 1. Characteristics of Industrial and Information Economies

Economy Aspect	Industrial	Information
DRIVERS-TOOLS PURPOSE RESULT	power production, machine tools amplification of human physical labor mass production, mass distribution of goods	computer & communications technology amplification of human mental labor mass creation of information & knowledge
PHILOSOPHICAL BASIS MANAGEMENT STRATEGIES & ORIENTATION VALUED ATTRIBUTES BASIS OF WEALTH	reductionism; law of cause and effect institutional hierarchies division of labor specialization standardization individual work; competition money	synergy; wholism limited hierarchies integration of "thinkers" & "doers" interconnection modularization participation; contribution information

Source: *An Introduction to Management Center Theory & Practice, Version 2.2*; Athenaeum International; February 1992.

Great progress in opening up the "Right Brain" of the organization is being made through all of these efforts; however, the biggest strides are resulting from the use of a process that facilitates group interactions and the environment in which they occur to challenge human creativity. This is done through managing the 7 Domains of activity within an organization.

Managing the 7 Domains

AEDC's product is information. The industrial/scientific way of viewing the world lends itself to a perception of the AEDC organization as a factory - an information factory. A Management Center is also an information factory which, according to MG Taylor Corporation, integrates the realms of activity necessary to create responsive, high-performance organizations. The desire, therefore, is to turn AEDC's culture into one that works as a Management Center.

The 7 Domains Model™ highlights seven interconnected focus areas that a Management Center, information factory integrates (Fig. 1):

Body of Knowledge. An organization's collective information, knowledge, and experience are the raw materials brought to the factory. In the factory, this material is used and re-used, combined, added to, stored, retrieved, analyzed, synthesized, and made available to each user at the right time and place, in the right amount and level of detail, so they can produce their product.

17

Process Facilitation. The work procedures and facilitation methods are the factory's process engineering. It is based not simply on methods of information management, but on a detailed understanding of the human creative process.

When a work group or project team is given a challenge and an unblocked environment in which to work, a multitude of ideas and possible solutions are readily generated. A Management Center facilitates the examining, challenging, and engineering of these ideas into complete solutions and action plans.

Education. Education provides a creative spark that allows the factory to innovate, to create new products, to reconceive existing structures, and when needed, to redesign the factory itself. Education provides the framework and tools that enable individuals to become more proactive and more capable of responding positively to changing conditions.

Environment. This is the factory's physical plant and tools which allow knowledge work to occur. For example, a Management Center factory allows its users to work big, using color and graphics, to design the models and solutions that are its product. Management Center people are supported by both simple and high-tech tools for information capture, development, and management.

Technical Systems. Improvements in available technology provide the capacity for the factory to automate. Over time, various labor-intensive functions can be handled by machines, so human involvement in the information refinement process can focus less on the tools and process, and more on the higher-level work of developing ideas and their expression (the factory's real product).

Technical systems include the building of advanced linkages between internal and external operations so that a fragmented, local knowledge can become organized and widely shared. An organization's technical system is akin to the human nervous system, providing knowledge of the activities and health of all the parts and of the external environment.

Project Management. This is the factory's methods and support tools for managing an activity or group of activities over time. Project management encompasses strategy development, its visual representation through maps, ongoing monitoring of its component tasks and activities, and feedback and communication among all involved parties.

Venture Management. The factory looks at itself, its entire enterprise, and seeks new opportunities and ventures internally and externally through venture management. This search may include finding a new use for an existing product, a new customer for an existing capacity, a new partner for a new venture, etc.

Each of the 7 Domains is a field of action with its own principles, rules, and disciplines, and each exists in any complex organization. Management focus, however, is usually peripheral and disconnected. A Management Center works to allow the 7 Domains to function as a unified entity, a system, a coherent whole required to realize the true power within an organization.

AEDC has begun the process of integrating its 7 Domains to transform the organization into a Management Center by first transforming individuals into Knowledge Workers - people capable of supporting the effective application of information and knowledge within the organization. Knowledge Worker education is being accomplished through practice in managing the 7 Domains on a smaller scale through a specific application of Process Facilitation called the DesignShop™.

Process Facilitation Further Defined

Process facilitation is the act of removing the road blocks in an individual's work process. These blocks may be of many types, such as physical (a work setting that hinders one's ability to organize information); conceptual (locked into past solutions or lacking models of new or different approaches); and temporal (not having the right people together long
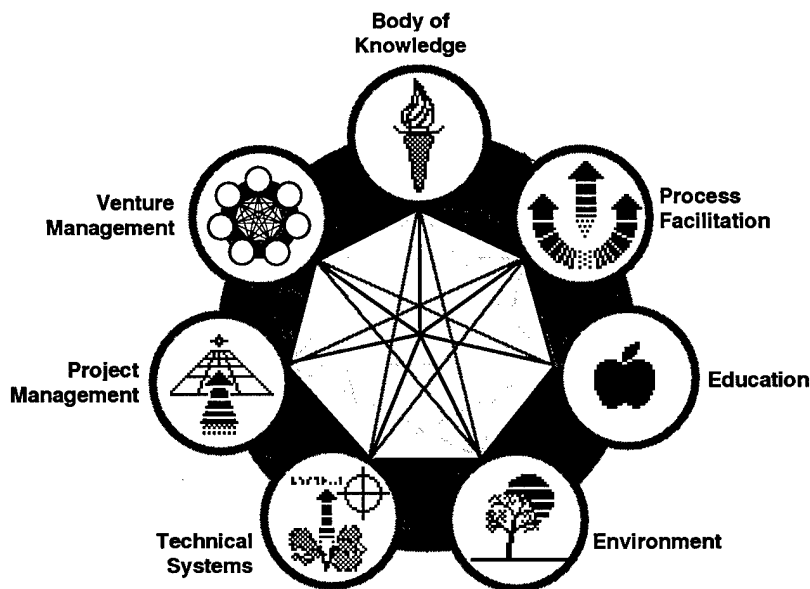
Figure 1. The 7 Domains' Model.

19

enough to break through to new solutions). In a factory, each manufacturing step is determined by a team of Industrial Engineers. In construction, the flow of materials and the order of work is structured by a Project Engineer. A motion picture 'story board' identifies in advance each resource required to shoot a scene. A musical concert is rehearsed. These are examples of process engineering. Process facilitation is the information equivalent of process engineering.

Each of the 7 Domains is managed within a facilitated group process event to create an information-rich environment. Participants are immersed in a complete design process in which they are led to discover new concepts. A physical environment conducive to high performance is provided, and tools and systems are supplied to amplify individual and group performance, to enhance organizing and project planning. In this setting, the group is challenged to remove barriers to entrepreneurship (organizing, owning, managing, and assuming the risks associated with a new enterprise).

The DesignShop

A DesignShop is a process of "decision by design" which differs from that of a typical planning meeting or negotiation session. During a DesignShop, participants are facilitated through a rigorous process of exploration, co-design, assessment, and decision-making.

The DesignShop experience is like combining a mountaineering expedition with engineering research and development: it makes physical, emotional and mental demands upon the expedition members and forces them into situations where teamwork is vital to success. Like an R & D project, it demands continuous creativity and the application of the team members' varied skills and knowledge.

DesignShops employ a simple model of creative problem solving called Scan-Focus-Act developed by Frank Burns and Linda Nelson (Fig. 2). To visualize how the model works, imagine a hungry lioness on the plains of the Serengeti. She Scans her domain for luncheon possibilities (note that scanning frequently takes a long time), Focuses on particularly attractive selections and positions herself appropriately, and then Acts to bring the meal down. Observe that Scan-Focus-Act is a natural way to solve problems. Observe also that groups of people, unlike the lioness, frequently choose to eliminate one or more pieces of the model, inevitably leading to imbalance and disharmony.

For example, some groups jump to conclusions about the nature of a problem and move directly to implement a set of hastily drawn-up actions. Instead of a cycle of Scan-Focus-Act, they continuously work in the Act phase. Teams that behave this way are called "reactive" teams.

Consider next the group that can never define the problem and prefers to work in an endless loop of philosophizing. They're lost in the Scan phase.

Scan-Focus-Act is the fundamental model which defines the philosophy of a DesignShop.

Scan is represented by a circle. The circumference, which has no beginning or ending represents the infinite number of options avilable at this point in the process.
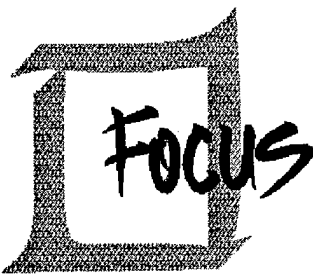
The focus phase is represented as a squre, symbolizing the narrowing of options to only a handful. Each option is fleshed-out and evaluated.
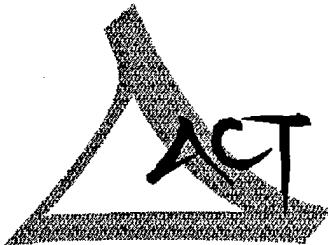
The Scan phase is expansive; the Focus phase is contractive; and the Act phase is explosive. Act is represented by a triangle, signifying both motion and direction.

Figure 2.
Scan-Focus-Act" model.

Some groups love to plan; they skip over the assumptions and information gathering required by a good Scan, and build elaborate models of who will do what when. Then they outline strict policies to ensure that the plan is followed to the letter. They are slaves to a relentless Focus. They ignore the changes in the environment around them that threaten their survival (failure to Scan) and give up opportunities in favor of strict adherence to a plan (failure to Act).

Most frequently, groups fail to conduct a proper Scan. They uncover a good idea or two and jump right into the Focus phase. Or perhaps they observe the symptoms of some difficulty and assume the nature of the problem without proper investigation. The resulting solution only relieves the symptoms, leaving the true problem to rage away unaddressed.

DesignShop participants are facilitated through a carefully designed series of exercises within the Scan-Focus-Act method of problem solving. Individual, small group, and large group activities are used to lead the participants through a process of exploration, co-design and decision-making. Scenarios and trend-tracking are used extensively as a means of anticipating future challenges and using an envisioned future state as the context for proactive decision-making. Other activities sometimes utilized include fish bowl conversations (topical discussions between key individuals staged to be viewed only by the audience with no interaction), games, inventions (designing, building, and marketing items that fulfill a specified set of characteristics), legends (skits and stories that portray future historical events), simulations, and syntopical readings (articles and books assigned to provide additional information about a given topic or to open up the reader to different viewpoints.

Throughout the DesignShop process, many different views and vantage points are represented, considered, and integrated into the final plan or product. The design process creates unforced alignment and support because solutions are systematically engineered and tested by all participants.

21

The Gossick Leadership Center

AEDC designed the Gossick Leadership Center (GLC) as the ideal environment for the creative, ollaborative design of solutions. The ultimate desire is to replicate this environment throughout all of AEDC.

WorkWalls™ abound within the GLC, and because of their write-on, wipe-off surface, encourage the use of graphics to enhance a group's capability to design and creatively think through ideas. Movable walls throughout the facility provide a flexible work environment which creates space to work individually, in small groups, and in large groups. Thus the GLC serves as a prototype and test bed for the AEDC of the next century

GLC core staff members are full-time Knowledge Workers who support the effective application of information and knowledge within the organization. Each staff member is expected to be familiar with every aspect of Management Center operations, and to apply the principles of each Domain to their activities within the GLC facility and elsewhere. Further, each member of the staff is expected to be capable of guiding users of AEDC Management Center processes to a more complete understanding and usage of each of the 7 Domains, and of all of the 7 Domains as a system.

Results

AEDC utilizes process facilitation and DesignShops with great success. A strategic plan was designed which lays out the Center's course for the next 40 years. Alliances were formed with academia and AEDC customers, including the University of Tennessee, Lockheed, Pratt & Whitney, Boeing, General Electric, and McDonnell Douglas. Partnerships are flourishing between the Air Force and other government agencies, contractor organizations, and the community. Labor-Management relations are greatly improved; for example, recent union contract negotiations were completed in record time. AEDC organizations are re-aligning themselves along business lines instead of functional lines, and the business planning process is being restructured.

All of these successes are keeping AEDC on the road to organizational transformation and on its strategic course. The bottom line results of these successes include maintaining AEDC as a national security asset for technological superiority of aerospace systems through realization of AEDC's vision of "Making AEDC the test center of choice, the work place of choice for our people, and a model of environmental excellence."

Summary

The Information Age is here. AEDC is beginning to manage its 7 Domains. Because of the benefits already realized, the goal is to make process facilitation and the DesignShop methods integral parts of the way AEDC works every day - everyone as a Knowledge Worker. It is happening. People are already showing creativity in the work place. WorkWalls are showing up in work areas, meetings are better designed and facilitated, information is being better utilized, and integrated teams are becoming the norm. Although AEDC still has a long journey ahead, its people are well on their way. Who knows? Maybe it is possible to transform a "Left-Brain" organization of the Industrial Age into a "Whole-Brain" organization of the Information Age, ready to face the challenges of the 21st century.

Acknowledgments

Bibliography

AEDC Strategic Overview. 1996.

"An Introduction to Management Center Theory & Practice," Version 2.2. Athenaeum International and MG Taylor Corporation. February 1992.

Sperry, R.W., "Lateral Specialization in the Surgically Separated Hemispheres," *The Neurosciences Third Study Program*. eds. F.O. Schmitt and R.G. Worden. MIT Press, Cambridge, Mass., 1974.

Wonder, Jacquelyn and Donovan, Priscilla. *Whole-Brain Thinking: Working from Both Sides of the Brain to Achieve Peak Job Performance*. Ballantine Books, New York, 1984.

Naisbitt, John. *Megatrends: Ten New Directions Transforming Our Lives*. Warner Books, New York, 1982.

Hawken, Paul. *The Next Economy*. Holt, Rinehart & Winston, New York, 1983.

Toffler, Alvin. *The Third Wave*. Morrow, New York, 1980.

Kanter, Rosabeth Moss. *The Change Masters: Innovation for Productivity in the American Corporation*. Simon & Schuster, New York, 1983.

Peters, Tom. *Thriving on Chaos: Handbook for a Management Revolution*. Alfred A. Knoff, New York, 1987.

"So, Your Unit Self Assessment Sat On A Shelf Again This Year?"

Capt Gordon J. Klingenschmitt

Capt Gordon Klingenschmitt is a 1991 Air Force Academy graduate, and completed M.B.A. coursework at Regent University, Virginia Beach, in 1995, where he'll graduate in 1997 with a double major in business and divinity.

After three years as a missile officer at the 91st Missile Wing, Minot AFB, North Dakota, he served one year as Wing Chief of Quality Improvement. Currently he serves on Operations Group staff at the 50th Space Wing at Falcon AFB, Colorado.

"So, Your Unit Self Assessment Sat On A Shelf Again This Year?"

WHY DID YOUR PEOPLE WRITE IT?

INCLUDES THE FOLLOWING:
1. HOW TO MAKE THE QAF CRITERIA APPLY TO YOUR UNIT MISSION
2. A FILL-IN-THE-BLANKS STRAT PLANNING WORKBOOK
3. COMPUTER SPREADSHEET WHICH SCORES YOUR USA
   (AND PRIORITIZES YOUR GAP ANALYSIS)
4. VISION OF A QAF PLAN GUARANTEED TO INCREASE YOUR
   BALDRIDGE SCORE
5. HOW TO GET EVERY WORK CENTER IN YOUR UNIT READY FOR YOUR
   QAFA

Gordon J. Klingenschmitt, Capt, USAF
50 OG/QI, 50th Space Wing, Falcon AFB, CO

Abstract

In many units, the "QAF Vicious Cycle" dominates the approach to Unit Self Assessment (USA), Strategic Planning, and QAFA preparation. Powerless and frustrated people are commissioned to decipher strange QAF Criteria language, interview people who don't understand, and write an 85 page USA report detailing how their unit doesn't really do Quality. Then the report sits on a shelf for a year, no QAF plan is written, no progress is made, and next year's writers rehash the same fruitless exercise to report essentially the same status. Without a clear QAF vision, the unit wanders in the QAF wilderness until the QAFA puts everybody in panic mode, and papers fly as people long to return to their REAL mission. Why do we do it?

The good news is, we don't have to. A common sense approach to making your USA USEFUL TO YOUR MISSION has finally arrived. It begins with your Quality Council brainstorming how to APPLY the QAF criteria to the MISSION, and writing a brief, visionary, practical "Unit Self Assessment of the Future." With a little cost-benefit multivoting, they sort out which QAF criteria subcategories actually apply, and which ones can be left for IBM

and Xerox to tackle. A simple spreadsheet PRIORITIZES your gap analysis, and suddenly your Strat Plan is setting MISSION-HELPFUL QAF GOALS which incidentally increase your unit's Baldridge score! No more pretending, no more guessing, just follow the formulas in this paper and you'll have a FACTUAL, MISSION-BASED QAF CRITERIA GAMEPLAN. Curious? Read on.....

PAPER CONTENTS:

1. YOU KNOW THE STORY
   The familiarity of the "QAF Vicious Cycle"—endless paperwork without mission utility.

2. THE SOLTION
   "QAF Winner's Cycle"—a plan to improve QAF criteria compliance with mission utility.

3. "HOW TO WRITE A STRAT PLAN" WORBOOK
   Simple, fill-in-the-blanks exercise workbook writes Strat Plan and QAF Plan for you.

4. CREATING A QAF CRITERIA VISION
   Writing a visionary "USA of the future," and applying the QAF criteria to your mission. Cost-benefit analysis helps you pick which QAF Criteria subcategories actually apply.

5. GORDON'S GAP ANALYSIS SPREADSHEET
   Simple scale (1 to 9) multivoting scores your USA, tells your Baldridge score. Low future mission payoff, and we're already strong here? Don't waste your time. Great future mission payoff, and we're not doing this yet? Focus your QAF efforts here.

6. PREPARING YOUR WORK CENTERS TO ACE YOUR QAFA
   Cascading functional plans give every soldier the answers, *before* the IG starts quizzing.

CONCLUSION: COMPARING OLD PROCESS TO NEW PROCESS RESULTS

FREE SOFTWARE AVAILABLE FOR D.O.D. USE: This entire paper teaches you how and why to use the following quality documents created by the author. All documents are available on disk—send an email note to KLINGGJ@FAFB.AF.MIL before December 1998.

1. STRATEGIC PLAN ANNUAL REVIEW WORKBOOK: A 41-page, fill-in-the-blanks workbook with exercises to be followed by any Quality Council in the development or annual review of their Strategic Plan and QAF Plan. Follows the 11-step planning model and summarizes the 500+ page text offered at AFQI's Strategic Planning Course. (REVBOOK.DOC)

2. GORDON'S GAP ANALYSIS SPREADSHEET: Computer spreadsheet which enables reviewers to enter simple scale (1 to 9) multivoting to score your USA, automatically tallying your 1000 point Baldridge score. Also enables any group of reviewers to multivote (simple 1 to 9 scale) on the costs and benefits of each of the 24 QAF criteria sub-categories as they apply specifically to the mission of your unit. Numerically prioritizes gap analysis telling which subcategories to focus on next year. (USASCORE.XLS)

3. QAF IMPLEMENTATION PLAN: An example of a visionary "USA of the Future" as created by the 91st Missile Wing Quality Council, Minot AFB, ND, Jun 95. Lists of practical, mission-based future solutions for every QAF criteria subcategory as applied to the mission of the 91 MW. Followed by verbally listed and numerically ranked, perceived costs and benefits of complying with each subcategory. Not only do they have a twenty year gameplan for each QAF criteria category, but they know which ones give biggest mission payoffs. (QAFPLAN.DOC)

4. 91ST MISSILE WING STRATEGIC PLAN: Separate from QAF plan, disk copies are available from 91 MW/QI, DSN 453-6267. Developed using the above mentioned workbook.

5. CASCADE DAYS FUNCTIONAL PLAN EXERCISE: 5-page, fill-in-the-blanks plan format to get every work center in your unit up to speed on customers, metrics, goals, etc. Ace your QAFA by having all work centers prepared in writing, in advance. (CASCADE.DOC)

6. FUN PLAN SCORING CRITERIA AND TRACKING SYSTEM: Improve the Quality of all work center functional plans, by scoring them and giving feedback to supervisors. (FUNCRIT.DOC, FUNTRACK.DOC, FUNINSTR.DOC, FUNSCORE.DOC).

1) YOU KNOW THE STORY...

It's that time of year again—time to re-write the Unit Self Assessment. "Didn't we do this last year?" somebody asks the commander. "Yes, but we're required to do it annually by Headquarters, so lets just get it over with," comes the response from the multi-tasked and overworked boss. But nobody is brave enough to say what everybody is really thinking..."Why do we wRIte this 85 page report every year? We wrote this last year, and nobody read it. We pulled 10 people out of the field for 40 hours of assessor training, 40

hours interviewing leaders who don't understand the questions, and 40 more hours of writing strange Quality language, and the report just sat on a shelf collecting dust! The commanders may have skimmed it over, but they didn't know what they were supposed to do with it. Perhaps they briefly considered some of the team's recommendations, but I haven't seen the USA ever impact our mission. Every year the USA writing team just re-hashes last year's report. But in substance, we always go back to business as usual. Quality has become an endless, symbolic paper chase."

Units who are silently familiar with the above voiced complaints have fallen into a trap. It is a QAF vicious cycle, where papers get shuffled year after year, and no genuine mission improvement results. People become bitteR with their leaders, accusing them of paying lip-service to quality, while leaders become confused by the Quality language, and deceived into thinking they've somehow checked the USA square with Headquarters and can safely return to the real mission. But secretly, even the commanders wish the USA was more useful than it is. Troops and commanders have a lot in common—they all want to escape the QAF vicious cycle.

Escaping requires (ironically enough) improving the process used to do Quality. But before you can "take action" at CIP step four, you've got to "evaluate the current process" at CIP step two. Let's peek in at the current process in many units, shown in Diagram 1.

Notice the highlights of the Vicious Cycle—Starting at the upper left, the Quality Council is not trained in managing by the QAF criteria (yet this is exactly how they are evaluated during a QAFA, and exactly how the Secretary of the Air Force picks the best unit!) Strange. Council members task others to learn the criteria for them, by assigning champions to write their USA. The champions have no power, however, to change policy or enforce compliance. Hmmm. After the USA is written, the Quality Council does not write a QAF criteria gameplan, instead they write a Strat Plan which does not specifically lead to better compliance with QAF criteria.

If any "gaps" are seriously addressed, they are mere reactions to the USAs list of "areas for improvement," with no consideration of cost or benefit of these categories to the actual mission of the unit. Commanders end up complying just to "do more Quality," and not because they perceive the QAF criteria is beneficial to the mission. For example, the Quality Council may run after QAF category 7.4—Customer Satisfaction Determination, because it has 100 Baldridge points, while it may only have a moderate amount of benefit to the mission. But they may ignore QAF category 5.1—Design and Introduction of Quality Products and Services, (only 40 Baldridge points), while it may have *tremendous* mission payoff. How do they know they're pursuing the subcategories with the biggest real mission benefits? Usually they don't.

"THE QAF VICIOUS CYCLE"

END

START

WING-LEVEL QUALITY COUNCIL MEMBERS NOT TRAINED IN UNIT SELF ASSESSMENT AND QAF CRITERIA

NEXT YEAR'S UNIT SELF ASSESSMENT IS THE SAME AS LAST YEAR'S-- NO PROGRESS OR IMPROVEMENT

ORGANIZATION IS NO CLOSER TO WINNING SECAF UNIT QUALITY AWARD

STRATEGIC PLAN AND USA SIT ON SHELF UNTIL NEXT YEAR, WITH NO INITIATIVES CONQUERED, NO METRICS TRACKED, AND NO FUNCTIONAL PLANS DEPLOYED DOWN TO SUB-UNITS

QUALITY COUNCIL MEMBERS NOT CONVINCED OF THE BENEFITS OF QAF MANAGEMENT

GAP ANALYSIS DOES NOT COMPARE PRESENT AND FUTURE, RATHER IT LOOKS ONLY AT THE PAST USA's "AREAS FOR IMPROVEMENT" (LIKE STEERING A CAR BY LOOKING IN THE REAR-VIEW MIRROR) GAP ANALYSIS ALSO DOES NOT CONSIDER COST EFFECTIVENESS OF PROPOSED SOLUTIONS

QUALITY COUNCIL MEMBERS TASK OTHER PEOPLE TO LEARN UNIT SELF ASSESSMENT AND QAF CRITERIA

UNIT SELF ASSESSMENT IS WRITTEN BY PEOPLE WIT CONSTRUCTIVE CHANGES

QUALITY COUNCIL MEMBERS DO NOT ENVISION THE FUT STATE OF THE ORGANIZATION WITH REGARD TO QAF CRITERIA-- NO QAF PLAN

QUALITY COUNCIL MEMBERS TASK OTHER PEOPLE TO SCORE UNIT SELF ASSESSMENT

QI FACILITATES STRATEGIC PLAN, BUT DOES NOT INCORPORATE GOALS WHICH SPECIFICALLY LEAD TO BETTER QAF MANAGEMENT USING QAF CRITERIA

QUALITY COUNCIL MEMBERS MAY READ UNIT SELF ASSESSMENT, BUT DO NOT PROACTIVELY PLAN IMPROVEMENTS TOWARD NEXT YEAR

HEADQUARTERS PROVIDES GUIDANCE ON WRITING A USA, INSTEAD OF IMPROVING TOWARD A KNOWN FUTURE

QUALITY ADVISOR HAS NO EXERCISES TO LEAD QUALITY COUNCIL IN DEVELOPING OF STRATEGIC PLAN. MUST CREATE OWN.

"The QAF Vicious Cycle"—diagram #1 (above)

The Strategic Plan often has a cutely phrased "vision statement" about becoming the best in the world, blah, blah, blah. But if you asked any leader, "What will your unit be doing in QAF criteria subcategory 2.3—Analysis and Uses of Organizational Level Data— in twenty years?" you'd probably get a blank stare. There is no VISION for the QAF criteria in the Air Force. And without a vision, your unit will never get there, much less ace your QAFA or become a SECAF Unit Quality Award winner. Further reading Diagram 1 will save you wasted effort.

2) The Solution:

Diagram 2 details the "QAF Winner's Cycle" which was successfully tried and implemented at the 91st Missile Wing, Minot AFB, ND. In one year, it raised the unit's SECAF award nomination Baldridge score from 67 to 245. But more importantly, it gave the unit something

SUGGESTED IMPROVEMENT--
"THE QAF WINNER'S CYCLE"
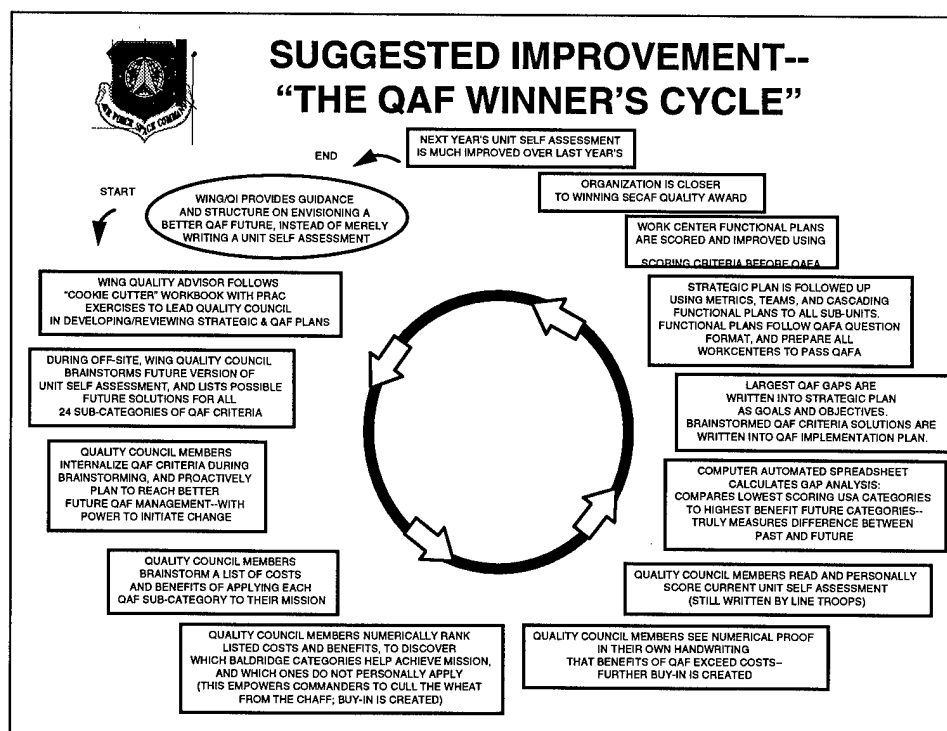
"The QAF Winner's Cycle"—diagram #2 (above)

Notice the highlights of the "QAF Winner's Circle." It begins with practical, hands-on exercises for your Quality Council on how the QAF criteria can be applied specifically to your unit's unique mission. These exercises are detailed in the STRATEGIC PLAN AN-NUAL REVIEW WORKBOOK described previously on the CONTENTS page, and available to you by email. As Council members brainstorm future solutions to each QAF criteria subcategory, they internalize the meaning of the QAF criteria, and start applying it instead of wondering what it means. At the same time, they list the costs and benefits of applying the QAF criteria. This is when the light bulbs start turning on in their minds. Without exception, my Colonels found that the benefits of EVERY QAF criteria subcategory outweighed the costs. The average perceived benefit was 8.0 (of 9) and the average perceived cost was 3.4 (of 9). Buy-in was instantaneous. Numerically ranking the cost-benefit ratios of the subcategories helped PRIORITIZE them, telling us which ones were immediately worthwhile to the mission, and which ones to leave until later. GORDON'S GAP ANALYSIS SPREADSHEET sorted out all the cost-benefit averages.

Notice that the USA is still written by in-house, trained assessors, but the scoring of the USA is done by the Quality Council. Better than no score, huh? Following the STRAT PLAN ANNUAL REVIEW WORKBOOK, each reviewer writes a simple, 1 (we're not doing this) to 9 (we're thoroughly doing this) score for each of the 24 USA subcategories. These scores are entered into the spreadsheet, and you instantly know your Baldridge score out of 1000 points.

The spreadsheet also prioritizes your gap analysis. What is a gap analysis? A Gap is the difference between the weaknesses of the past and the strengths of the future. If you only know the past, you cannot figure out a gap. You must also know the future. This is why most units do not do genuine "gap analysis," because they have no vision of the future regarding the QAF criteria. All they have is a USA, which is a picture of the weaknesses of the past. What they call gap analysis is merely a list of areas which need improvement. But genuine gap analysis will consider the DIFFERENCE BETWEEN THE PAST AND THE FUTURE, and identify BIG GAPS (big future mission payoff minus big past USA weakness) versus SMALL GAPS (small future mission payoff minus small past USA weakness). Obviously you want to tackle the biggest mission payoff, not just what somebody thinks is an "area for improvement." Again, GORDON'S GAP ANALYSIS SPREADSHEET does all the work for you—you just plug in the 1 to 9 "Future USA" cost-benefit ratings and the 1 to 9 "Past USA" score ratings.

After identifying the biggest gaps, you write them as goals and objectives into your STRAT PLAN. Next, you type up your lists of future QAF criteria solutions (with costs and benefits and scores) in the form of a QAF IMPLEMENTATION (CRITERIA) PLAN. (Sample described in CONTENTS and available by email.) This is separate from your STRAT PLAN.

Finally, you cascade your STRAT PLAN down to your work centers using functional plans. But why not get your work centers ready to ace the QAFA at the same time? By having every work center prepare written answers to the QAFA interview questions in the middle of their functional plans, you'll have everybody in the office reading off the same page of music. Following the 5-page CASCADE DAYS FUNCTIONAL PLAN EXER-CISE cookie-cutter, fill-in-the-blanks format, you can have every work center identifying customers, suppliers, cross-talks, metrics, goals, objectives, etc. in as little as 3 days. Improving these plans is easy when Unit Quality Advisors score them and give feedback to supervisors, IAW my available scoring criteria. (See CONTENTS page for descriptions and how to get free copies of all this.) Following is an item by item breakdown of the QAF Winner's Cycle, and the free materials described above.

3) "How To Write a Strat Plan" Workbook:

This practical aide is a 41-page, fill-in-the-blanks workbook with exercises to be followed by any Quality Council in the development or annual review of their Strategic Plan and QAF Plan. It summarizes the 500+ page text offered at AFQI's two week Strategic Planning Course. If you can or if you can't attend the course, get this workbook anyway. It will sort out the bare necessities for your Quality Council in a format everybody can understand and follow. Here's an example of a few of the exercises:

3.2. IDENTIFY OUR CUSTOMERS

Exercise (5 minutes): Brainstorming—List Potential Definitions of "Customer"

Exercise (10 minutes): Brainstorming—
1) List all external customers of our unit.
2) From these, identify our key customer(s) using the 80/20 rule.
   (i.e., 20% of these people take up 80% of your time. If this 20% ceased to exist, your workload would be reduced by 80%).

Review (5-10 minutes): Review and Discuss Unit COPIS diagram.
   Reference #9. Key Customers. Should this list of key customers be altered?

3.3. DETERMINE KEY OUTPUTS:

Exercise (10 minutes): Brainstorming—What do our external key customers really expect?

Review (30 minutes): Review and Discuss the Key Result Areas (KRA's) and Key Outputs (KO's) from last year's Strat Plan.

This workbook leads your Quality Council step-by-step through the 11-step planning model, and is easy to follow even without facilitator's experience. It can be completed in 4 off-site days, which include brainstorming a "Future USA," doing cost-benefit analysis of all QAF criteria, scoring last year's USA, and writing both a Strat Plan and QAF Implementation (Criteria) Plan.

4) Creating a QAF Criteria Vision:

Following the STRATEGIC PLANNING ANNUAL REVIEW WORKBOOK, you will come to step 4 of the 11-step planning model, "envision the future." What you do at this stage is critical to the future of QAF in your unit. Will you spend 5 minutes writing a cute little vision statement about "we're gonna be the best...." OR, will you dive into the QAF

criteria and plan genuine futuristic improvements to your QAF criteria management? If you don't plan for better QAF criteria management in the future, your Baldridge score will never go up. The right answer is to stick with the exercises in the workbook.

First, get your Quality Council to commit to brainstorming about the future of QAF criteria management in your unit. Next, take the 24 QAF criteria subcategories, one at a time, and read them out loud to the council. Read the details, and start to ask your Quality Council, "How will we be complying with this QAF criteria subcategory in twenty years?" Spend about 10 minutes on each subcategory—just brainstorming potential solutions AS THEY APPLY TO YOUR UNIQUE MISSION and listing them on a piece of paper. Then take 5 minutes each to brainstorm potential benefits and costs, and have the members write their benefit multivote and cost multivote on a scale of 1 to 9 in their workbooks. Your results will look something like this:

Category 3.2—Quality and Performance Plans
IDEAS: (1) Translate Quality into OI's
    (2) Leadership training
    (3) Establish standards/goals/metrics
    (4) Facilities/Training plans/Comm/REACT/SRV
    P.A./environmental/finance/improved facilities
    MAF's/GRP
    (5) Reorganize command section
    (6) Quarterly? Two years? Five years?
    (7) Short term metric/Long term metrics
    (8) Family of plans, Resource/safety, FOT&E
    (9) Customer surveys
BENEFITS: (1) Focus/Direction   AVG BENEFIT SCORE: 8.5
    (2) Personnel satisfaction
    (3) Clear expectations
    (4) Reinforce quality objectives
    (5) Prioritize resources
COSts: (1) Time/people   AVG COST SCORE: 4.8
    (2) Dedication
    (3) Customer surveys
    (4) Equipment
CATEGORY OVERALL COST BENEFIT RATIO: 1.8   RANK VALUE (of 28 categories): 23

Category 4.1—Human Resource Planning and Management
IDEAS: (1) Personal mail feedback   (11) Reading Libraries
    (2) Suggestion program   (12) Rewards
    (3) Sell Minot & 91 MG   (13) LPDP
    (4) Increase responsibility levels   (14) Exchange Officers
    (5) Create human resource plan   (15) Short term/Long term
    (6) Track stuff, PME, education, Org climate survey, weekends off
    scheduling rates, wellness, family indicators
    (7) Publish results and influence changes
    (8) Officer, enlisted, and civilian plans
    (9) Awards Program, plan awards effectively, give them often
    (10) Mobility Plans, Manning/Promotion decisions
BENEFITS: (1) Happy people   AVG BENEFIT SCORE: 8.0
    (2) Motivated, productive
    (3) Morale, satisfaction up
    (4) Quality of Life up
COST: (1) Little money   AVG COST SCORE: 3.7
    (2) Time to plan
    (3) Create tracking mechanisms
CATEGORY OVERALL COST BENEFIT RATIO: 2.2   RANK VALUE (of 28 categories): 20

Do this for all 24 QAF subcategories, asking "How will we be doing this in 20 years?" Then multivote (1 to 9) on the perceived strength of the benefits versus the costs. Enter the numbers into GORDON'S SPREADSHEET, and soon you'll know exactly where your biggest mission payoff is. Just follow the WORKBOOK and it'll all work out fine. The aggregate of all your Quality Council's brainstorming should be retained on paper, and compiled into your "USA of the future" which is also called the QAF IMPLEMENTATION (CRITERIA) PLAN.

This creates the basis for your vision of the future. You don't just have a cute statement, rather you have a PRACTICAL, MISSION-BASED, REALISTIC GAMEPLAN for complying with each of the QAF criteria in the future. Your USA will spring off the shelf into the policies and lifestyle of your unit. And your Quality Council will internalize the QAF criteria, see that the benefits outweigh the costs (they always do), and walk away with written and practical reminders of how to APPLY THEM TO THE MISSION. As for the ones which score high in cost, and low in benefit? Leave those for IBM and Xerox to go after. We want QAF principles which are actually applicable to our unit's unique USAF mission. I tell you, this system is exciting! It empowers commanders to make the QAF criteria useful to the mission!

5) Gordon's Gap Analysis Spreadsheet:

Next, your Quality Council must assess current capabilities. We already created a great QAF criteria future plan, but where does our unit stand today in the QAF criteria? Luckily, your assessors just wrote a Unit Self Assessment to tell you exactly that. Let your Quality Council score the USA! With simple scale (1 to 9) multivoting, the WORKBOOK and SPREADSHEET make scoring any USA a breeze. Just have the Council reviewers write down their numbers! Here's an example from the WORKBOOK:

1 2	**3** 4	**5** 6	**7** 8	**9**
We're not doing this	We're beginning to systematically approach this	Fully deployed, early stages must improve	Fully deployed, mature, provable, systematic effort	No weaknesses, used daily by everyone everywhere

QAF Criteria Sub-Category #	Wing/Group USA(1 to 9)	Squadron/Flt USA(1 to 9)
1.1 Senior Leadership	____	____
1.2 Leadership System and Organization	____	____
1.3 Public Responsibility and Citizenship	____	____
2.1 Management of Information and Data	____	____

Collecting these USA score numbers from your reviewers, then entering them into the spreadsheet will give you an automatically calculated Baldridge scORe out of 1000 points. Then you can create a brief list of "Top Ten QAF Criteria Subcategories We're Not Doing Now."

Collecting the previously scored, future-based cost/benefit numbers, and entering them into the spreadsheet, will help you create a cost/benefit prioritized list of "Top Ten QAF Criteria Subcategories Most Beneficial To Our Mission." Then the magic happens. The Gap Analysis.

What if a subcategory has a combined high benefit, low cost, and low current USA score? That's obviously a BIG GAP. Big payoff. We're missing out on benefits cuz we're not doing it. Go after it! Write that one as an objective into your Strat Plan! But what if a subcategory has a combined low benefit, high cost, and high current USA score? That's obviously a SMALL GAP, or even a NEGATIVE GAP. Maybe your unit is already spending time doing something which costs more than it benefits your mission! Ouch. Better ease off on that QAF criteria subcategory. Leave that one for IBM. It's hurting you. (Although experience shows none really hurt you, they just have less benefits.) The SPREAD-SHEET will automatically calculate these gaps for you, so you can create your final list—the most important one, "Top Ten QAF Criteria Subcategories which are GAPS TO BE FIXED ASAP." These are the ones you write into your Strat Plan as goals and objectives. Assign some teams to take advantage of your Council's brainstormed future solutions for that subcategory, and start turning your VISION into POLICY. Finally your mission is impacted directly by something in the USA. Wow!

6) Prepping Work Centers to Ace Your QAFA:

OK, so you've used the WORKBOOK to write your Strat Plan and QAF Plan. You've got a great future ahead of you. But does anybody know about it, besides your Colonels? And oh, by the way, the QAFA is around the corner, with the IG asking questions to all your airmen—not just the Colonels. Every work center with an open door ought to have pre-written answers to the questions that will be asked by the IG inspectors. Questions like, "Who are your customers? What makes them happy? List your key processes. Show me your flowcharts and metrics. Do you measure progress toward any goals and objectives? How do you give feedback to your suppliers? What Quality Teams have you chartered?" The easiest way to get these questions answered ahead of time, is to make people get together and write out answers. Any shop with an open door is fair game for inspection. They should all have individual written plans long before.

Following the CASCADE DAYS FUNCTIONAL PLANS EXERCISE is the easiest way to get the job done. Simply distribute copies of the 5-page, fill-in-the-blanks, cookie cutter format, and tell people their answers will be graded. First write functional plans (some call them action plans) at the squadron level, then at the flight level, then at the work center level. Ensure squadron quality advisors score the plans IAW established scoring criteria (see CONTENTS to get mine if you wish), and ensure the low-scoring plans are re-written before the QAFA arrives. Have each plan displayed proudly in that work center's Quality Binder (with their metrics, flowcharts, storyboards, etc.), and ensure every troop knows how to brief it when required. Cascading functional plans give every soldier the answers, *before* the IG starts quizzing.

At the wing level, you may wish to use a tracking system (ours is available—see CON-TENTS page) to know which plans need to be improved, and which ones score highly. Ensure your supervisors are rewarded or retasked as necessary, and ensure Squadron Com-manders take responsibility for their people.

Getting every work center to define their customers, mission requirements, success indicators, goals, supplier requirements, etc. is very valuable to defining the scope and mission of that office. Suddenly people become very efficient at doing what's required, making customers happier today than they were yesterday, and using resources more effi-ciently than ever before. But until theY

Conclusion: Riding the Winner's Cycle:

After riding the Vicious Cycle for several years, are you ready to commit to a change? Is your Commander ready to commit? If you're not yet sure, here is a brief comparison of the results. Will you follow the old process, or will you benchmark off this industry leader by trying a new process? Here's the difference. I look forward to receiving your email re-quests.

Technology And Innovation:
The Air Force Reserve Funds Control Vision
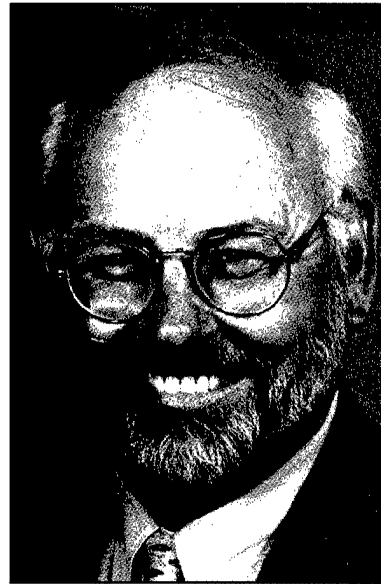
Ms Melissa A. Trichinotis   Mr L. A. Collier, Jr.

Ms Trichinotis is currently a management analyst in the Comptroller Plans division, Financial Management (FM) directorate, Headquarters Air Force Reserve. She also serves as the FM Quality Coordinator. During the past year, Ms Trichinotis chaired the FM self assessment team and also served on the headquarters' self assessment team.

Ms Trichinotis holds a bachelor's degree in English from Wesleyan College and a master's degree in public administration from Georgia College.

Mr Collier is the Assistant Director for Financial Management, Headquarters Air Force Reserve. Prior to assuming this position in 1995, he served as chief for both the Comptroller Plans and Accounting and Finance divisions. During the past year, Mr Collier served as a category champion for the headquarters self assessment team.

Mr Collier holds a bachelor's degree in accounting from Georgia Southern University and is a graduate of the Professional Military Comptrollers' School.

Technology And Innovation:
The Air Force Reserve Funds Control Vision

Ms Melissa A. Trichinotis and Mr L. A. Collier, Jr
HQ Air Force Reserve

Still the question recurs "can we do better?" The dogmas of the quiet past are inadequate to the stormy present. The occasion is piled high with difficulty, and we must rise with the occasion. As our case is new, so we must think anew and act anew.

Abraham Lincoln
December 1, 1862

Abstract

The ultimate mission of Reserve financial management (not just for the Air Force Reserve but for all Reserve Components) is to pay the member. To accomplish this mission within the Congressional funding and Anti-Deficiency Act constraints, we must get valid, realistic, timely obligations early in the process rather than be forced to react to a spending trend. For Operations and Maintenance (O&M) funds, standard Air Force systems provide sufficient status information. The same is unfortunately not true for the Reserve appropriation. This pronounced deficiency, combined with a lack of standardized accounting philosophy among the Reserve Components, increases the potential for funds control problems.

With these thoughts in mind, the Air Force Reserve Financial Management vision unfolds. First, we want to standardize the Reserve Components' funds control philosophy (from manday to dollar accounting), which changes the very essence of financial management operations. Facilitating this change among the other Reserve Components is the second part of our vision. This part of the vision involves developing an integrated database system that will provide the financial management tools necessary to successfully accomplish dollar accounting.

The success of this vision depends on achieving three major goals — formalizing our funds control architecture, reengineering the existing funds control systems, and benchmarking our efforts with the other Reserve Components. This paper is dedicated to the successful measures that have been taken to achieve the Reserve Funds Control vision.

Section I: A Little History Lesson

It is important that we understand the Air Force Reserve before we proceed with any discussion about financial management or funds control systems. The following mission and funding facts are the fundamental building blocks to understanding the scope of Reserve activity.

First, in terms of mission activity, the Reserve uses a mixture of eight weapon systems and a total of 415 aircraft to contribute to 20 Air Force flying activities. In five of these activities, the Reserve contributes more than 50 percent of the mission, including three for which we have full responsibility. These missions and the percentage of Reserve contribution to the total force include:

MC-130 Combat Talon I Capability	57%
Total Medical Crew Capability	71%
HH-60 Range and Shuttle Support	100%
Aerial Spraying Capability	100%
WC-130 Weather Reconnaissance Force	100%

Since its successful integration with the active duty forces in Desert Shield/Desert Storm, the Reserve has supported the Air Force in all major operations since 1991. A partial list of these operations include Provide Hope (USSR/CIS, 1991-2), Provide Relief/Restore Hope (Somalia, 1992-3), Uphold Democracy (Haiti, 1994), Vigilant Warrior (Kuwait, 1994), Provide Comfort (Kurds in Turkey, 1991-present), Provide Promise (Bosnia, 1992-5), Southern Watch (Saudi Arabia, 1993-present), Support Hope (Rwanda, 1994-5), and Distant Haven (Surinam, 1994).[1]

For these special missions as well as the general day-to-day activities, the Reserve operates with a population of approximately 75,000 members at 37 flying wings operated on a full-time basis. Figure 1 displays the extent of Reserve financial management activity within the continental United States.

In support of these activities, the command processes as many as 40,000 pay transactions per day and 150,000 travel transactions yearly. Total program costs for the Air Force Reserve are $2.5 billion annually (FY96) — approximately $1.5 billion for O&M budget concerns and $.8 billion in the Reserve Personnel Appropriation. All told, the Reserve accomplishes 40 percent of the Air Force mission with three percent of the overall Air Force budget.

---

[1] *AFRES Facts and Figures*, March 1996 (HQ AFRES/PA, Robins AFB GA).

Air Force Reserve Financial Network

Agent Bases

Tenant Units

Figure 1. AFRES Financial Network

Section II: Formalizing the Reserve Funds Control Architecture

Once you understand the scope of Reserve involvement, you can see why the Reserve FM community was worried about the lack of standard systems to manage the Reserve Personnel Appropriation. Rather than worry, however, what we probably should do is consider ourselves fortunate that we actually were given an extraordinary opportunity. This opportunity allowed us to shape not only our own destiny but also the destiny of the other Reserve Components FMs.

Achieving our first goal — formalizing a funds control architecture — was the first step in shaping our own destiny. As we stated earlier, Air Force Reserve funding is congressionally allocated and tracked (i.e., outside of regular Air Force channels for funding distribution). Over the course of time it became clear that the majority of standard Air Force financial management systems could not support our special requirements. In order to ensure that we can budget for, track, and pay reservists (no matter what status they are in) in a timely manner, we require a unique, comprehensive system for funds control.

In the late 1980s, we began developing the individual systems that would eventually come together as the AFRES funds control network. Different headquarters analysts have responsibility for each of the individual systems, but the unit FMs played — and continue to play — a critical role in system development. It is important to understand that each program was developed to meet a specific need for which there was no standard systems support. And our unit members identified the majority of these requirements.

All told, when the majority of original system development was finished in the mid-1990s, there were Reserve-unique systems to cover every aspect of paying the member, from sign-in/sign-out on Reserve weekends to the actual cutting of the check. In the end, we had created a Reserve-unique funds control system architecture (see Figure 2).

Figure 2. Reserve Funds Control Systems Architecture

Since its official release, this architecture has been the focal point of at least one audit and numerous discussions with the other services. More importantly, it has been accepted as the most comprehensive system of funds control for the Reserve appropriations.

Ensuring that each system meets our changing customer needs is one of our primary objectives. The constant communication between the headquarters and the field unit necessary to continue the system development and updating processes is phenomenal, and it is never-ending. Our unit FMs do all beta testing, and we consider their feedback before any new system or system update is released to the remaining units.

Section III: Reengineering — Taking Advantage of Technology

Once we validated that our funds control architecture contained the right pieces, we began to look at how to make it work better. Part of this relook — officially called funds control systems reengineering — was dictated to us. The other parts were our own initiatives. This section will look at the planning processes used in the reengineering effort.

By now, many Air Force personnel have heard about Defense Management Review Decision (DMRD) 924, the USAF Consolidation of Standard Base Level (SBL) Automated Data Processed (ADP) Operations. This document, more than any other single decision, changed the course of future funds control technology.
Without going into elaborate, unnecessary detail, the impact of DMRD 924 was this: all Air Force ADP operations would be consolidated into several Defense MegaCenters (DMCs), an effort also known as standard base level computer (SBLC) regionalization.. We would relinquish our data processing hardware, and eventually the DMCs would become "business ventures," charging us a "fee-for-service" for data storage and processing time. Furthermore, we were scheduled to turn over all software development and maintenance to the Standard Systems Center (SSC) at Gunter AFB AL.

Many commands did not see the document as a threat. We, however, realized that it was the handwriting on the wall. Our entire way of doing business was about to change. Losing our data processing hardware was a difficult blow to take. Even more difficult was the threat of having no Reserve-unique software systems for funds control. We had made so much progress that we could not conceive of giving it all up.

Fortunately, the SSC realized that although they were chartered to develop and maintain all standard systems, they could not support our extensive programming requirements. Once we were given an exemption from software migration, we began the task of planning to reengineer our funds control systems to meet new hardware requirements.

The components of the reengineering plan were:

— Assess the new business environment (both hardware and software)
— Look at our customer demographics
— Maintain the integrity of our customers' requirements

The first component of our plan, assessing the new business environment, involved taking a good look at new technology as well as policies that would affect our choices. There were several basic assumptions. First, we must discontinue operating through dial-up communications lines. They are expensive ($800,000) per year, but more importantly they were unnecessary as a result of the local area network/wide area network (LAN/WAN) in which the command invested. Second, our hardware and communications would have to meet new industry standards, "Client/Server" operations based on the OSI model.

Meeting these hardware standards actually proved to be the easiest part of the process. Once the money was made available for purchasing the necessary pieces of equipment, our hardware/communications architecture was set to change. The hardware and communications in the old architecture is represented in Figure 3.

Figure 4 represents the new hardware and communications architecture.
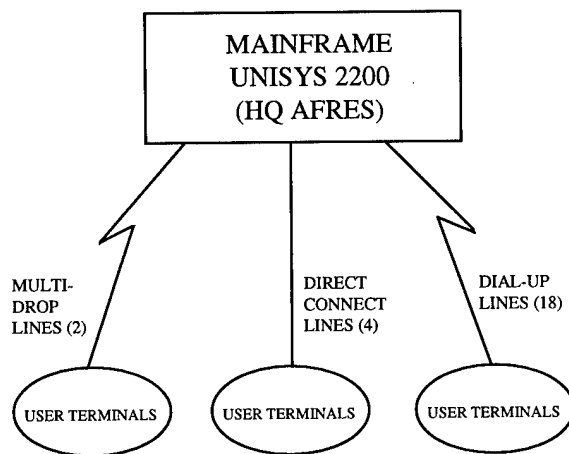
Figure 3. Old Systems Architecture
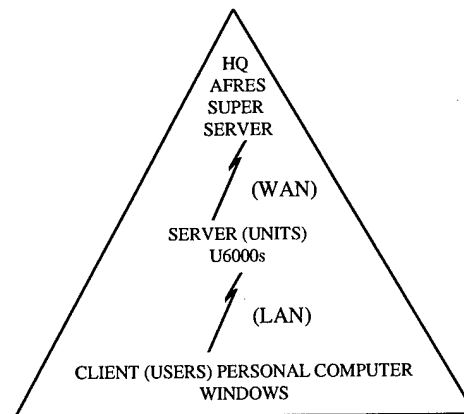
Figure 4. New Systems Architecture

Fortunately for us, this hardware and communications architecture met the most important criteria of all: transparent migration of operations at the unit level.

Once the hardware and communications details were decided, we started looking at the actual funds control systems. Under the old funds control architecture, there were separate systems to perform each funds control task. Unfortunately, each system had its own database and report generation module. More unfortunately, several of the PC-based programs required so much memory that each had its own PC. This meant that most FM shops had

between 5 and 6 separate PCs to accomplish this funds control architecture. Furthermore, these systems were slow to access and slower to generate reports. Our unit FMs were constantly communicating these difficulties, and now was obviously the right time to take another look at our customers.

In his recent book The Road Ahead, computer giant Bill Gates recommends to "think about how they [managers] would like their business to work. What are its essential processes and its key databases? Ideally, how should information move?"[2] Once we had decided on hardware and communications, it naturally followed that these were the next questions we asked.

The essential processes — budgeting, tracking, and paying — were easy to identify and to map, and fortunately they did not change from user to user (manager to manager). Mapping these processes also made identifying the information our customers required much easier. The reengineered systems would require very little new information since the old systems were based primarily upon customer requirements. What our customers really required in the reengineered systems was faster processing. As long as the information (reports) did not change, we could reengineer the systems to move data any way needed. Thus, the first requirement for our reengineering plan was to somehow allow for much more rapid data access and retrieval.

Beyond understanding functional requirements, we acknowledged for the first time that the reengineered systems must take into consideration the demographics of the average FM shop. As we reviewed the unit FMs, four basic characteristics became apparent. FM shops have low grade structure, high turnover, high workload requirements, and a small staff that has little time to participate in cross-training or job responsibility sharing.

The final customer survey involved the amount of hardware each FM office was required to support in order to run these independent systems. Our review indicated that many of the old systems, particularly the PC-based systems, required more computer expertise from the unit level personnel than was fair to ask. An average wing FM maintained five or six separate PCs, and each system required a separate hardware setup and printer. Thus, we basically were asking our FM personnel to be responsible for duties beyond the scope of their formal training. The unit FMs are under enough stress just trying to complete their job responsibilities without adding computer headaches to the list of "other duties as assigned."

Given the nature of the client/server technology, it was clear that our systems should be migrated to a relational database environment. In essence we would reengineer the individual systems to actually exist as one program with separate report generation modules. Using our in-house programming staff (actually a group of out-sourced contractors), we have begun rehoming the software.

---

[2] Bill Gates, *The Road Ahead.* (New York:The Penguin Group), pg 136.

As the reengineering effort has progressed, several other advances have been made. The advance with the most potential for wide-spread use by other commands involves user manuals. The Air Force currently only requires printed user manuals, but with the high turnover in our FM shops, these manuals did not provide sufficient instruction for new employees. The new funds control systems (report generation modules) will store and access their user manuals electronically. These help manuals will closely resemble the types of hypertext help screens found in Microsoft products. Most importantly, the on-line help will be simultaneously released with the program. It is not uncommon for program releases to be delayed by two to three months awaiting documentation. Our new systems will not be hindered this way. It's just another way to meet our customers' requirements in new ways that take advantage of the incredible technology available to us.

Section IV: Benchmarking Makes Good Sense

Technically, the responsibility for all accounting system development and maintenance belongs to DFAS-DE (per DMRD 918), and part of that responsibility includes the Reserve accounting systems. Through early dealings with the separate Reserve Components, DFAS-DE realized that there was no dialogue between the components and more importantly that no two accounting systems were alike. In trying to find a solution to its Reserve problem, DFAS-DE established a Reserve Components Working Group (RCWG). The charter of the RCWG, comprised of representatives from each Reserve FM, was to standardize Reserve financial management operations.

The group has met at least two to three times yearly since its inception in early 1994, but it became apparent early in the process that DFAS-DE did not have the resources to develop a separate RC funds control system. More importantly, it did not need to.

In early group discussions and presentations, it became clear that both the Naval and Air Force Reserve FMs had made significant strides towards standardization — the Naval Reserve from an actual networked program perspective and the Air Force Reserve with its entire funds control systems philosophy and architecture. As a result, instead of reinventing the wheel, the group is using the Air Force Reserves' funds control system as a model for developing a standardized Reserve funds management philosophy and system.

The heart of this philosophy involves the use of dollar accounting rather than manday accounting to track funds and the actual systems used to do the tracking. While the technical details of manday versus dollar accounting may seem insignificant, the form of accounting used is actually quite critical. Although tracking mandays (the actual number of days for which a reservist is paid) may be the easiest way to view Reserve participation, mandays cannot be used for much other purpose. Everyone from Congressional staffers to the Service Secretaries understands dollars. Thus, everyone else talks about appropriations in terms of dollars expended. The tedious process of converting mandays to dollars must be accomplished before any budget discussions can occur.

More importantly, dollar accounting is more accurate. We in the Air Force Reserve financial management community have witnessed firsthand the importance of understanding how and when dollars are being expended. It is almost impossible to guard against funds overobligation if dollar accounting is rejected in favor of manday accounting.

The best argument for converting to dollar accounting is the funds control system outlined in this paper. The main reason our system works is that it provides an oversight that the accounting systems at Denver still cannot accomplish. Seeing the success we have had with the system has brought a conversion in all but one of the Reserve Components.

Ironically, the RCWG as a body led by DFAS-DE has produced very few tangible results. The individual members of the RCWG, however, have made their own strides. We are particularly proud that several of our systems, including our pay system, have been the subject of benchmarking sessions with each of the other individual Reserve Components.

Although they come to us for solutions, we realize that we still have much to learn. Through these meetings, we continue to discuss our common problems, and we continually refine the Air Force Reserve funds control system. From improving reports to increasing system response time, we learn from our brothers and translate our learning into results.

Section V: Accelerating the Pace of Change

We began developing funds control systems with one purpose in mind — to provide the oversight no one else could provide for us. Although the old funds system architecture met that requirement, we are confident that the reengineered systems will be even better. More importantly, we have been able to include the other Reserve Components in our efforts. We have been able to share with them, and they have made significant, rapid progress in both their accounting philosophies and their actual systems.

We are proud of the work we have accomplished, but there is more work to be done. We have asked ourselves, "Can we do better?" and answered "Yes, we can!" We must stay ahead of changing technology while still maintaining the integrity of our customers' requirements. To rise with the occasion is our vision, and we work with the other Reserve Components to see it realized and accepted by us all.

Using New Technology To Collect And Spread Best Practices In Air Combat Command

Maj Damon K. Booth

Maj Damon K. Booth is Chief, Air Combat Command Inspector General Best Practices branch at Langley Air Force Base, Virginia. He leads the branch responsible for promoting benchmarking and collecting and spreading best practices in Air Combat Command. He has three years experience as a Quality Air Force assessor. He is a senior pilot with over 4200 flying hours in C-130 aircraft.

Using New Technology To Collect And Spread Best Practices In Air Combat Command

Maj Damon K. Booth
Chief, ACC IG Best Practices Branch

Abstract

Benchmarking is a process improvement tool that fits well into a warrior culture. It is a systematic process of capitalizing on the knowledge gained by studying competitors. Benchmarking best practices is a performance improvement tool that you can apply to any organizational process. In today's fast changing environment it is critical to have a system in place to identify, capture, and spread best practices to help organizations learn faster than our adversaries. This paper outlines the strides the Air Combat Command Inspector General has made to help organizations benchmark best practices. It traces three generations of crosstell products and explains how innovative ideas combined with new technologies have contributed to our command's performance improvement efforts.

Introduction

Hoshin Tenkai! This is a Japanese phrase synonymous with breakthrough improvements to gain a competitive advantage. These breakthrough improvements are made possible by illuminating and studying an adversary and anticipating their every possible move. It is taken from a samurai warrior philosophy of looking into the future to anticipate every possible move of the enemy. (Watson, Advanced Benchmarking Workshop)

The United States military and its coalition partners successfully deployed this warrior philosophy in the Persian Gulf war. The CENTCOM staff studied Saddam Hussein's moves during the eight year war with Iran. Our war planners were able to get "inside his head" and design an air campaign that paralyzed his forces and set them up for the following "Hail Mary" entrapment.

Benchmarking is a process improvement tool that reflects this forward thinking warrior philosophy. It is a mindset that can be applied to not only war planning but to any organizational process. Any process can be improved by illuminating and replicating standards of excellence. What units need for competitive advantage and continued success is a tool for integrating best practices into their key processes. Benchmarking is the tool of choice. But you may ask, "How are units supposed to identify these best practices?" "Should units benchmark using extra sensory perception (ESP)?" I think not. The office of the Inspector

49

General, Air Combat Command, provides an infrastructure to illuminate, collect, and spread best practices. The ACC IG has committed personnel and technological resources to help units searching for best practices. "Spreading best practices" is integral to our command-wide benchmarking effort.

Purpose

The purpose of this paper is to tell the story of how the Air Combat Command Inspector General uses creative thought and innovation to improve the command's best practices sharing system to aid our units in their performance improvement efforts. The IG is using the latest technology to collect and spread best practices to promote benchmarking among and between our units and other MAJCOMs.

Defining The Terms

Organizational comparisons - the practice of sharing operational or process measurement results data to gauge relative performance. (ACCPAM 90-103)

Benchmark - a performance level recognized as the standard of excellence for that process. (AFQI Basics of Benchmarking course book)

Benchmarking - the systematic approach of identifying and adapting best practices to accelerate improvement within an organization. (ACCPAM 90-103)

Best Practice - an innovative method, technique, or approach that leads to benchmark performance. (AFQI Basics of Benchmarking course book)

From the definitions, it follows that organizational comparisons are an integral part of and must precede benchmarking. We cannot identify a benchmark process unless we first have organizational comparisons of operational results. During inspection and assessment processes, the IG observes similar processes (in many different organizations) such as mobility, deployment, and aircraft generation. While observing these processes, the IG identifies best practices as well as assigns a five-tier adjectival rating. The adjectival ratings range from unsatisfactory to outstanding. In addition to identifying process best practice candidates, the units that receive outstanding ratings have processes in place that are also possible benchmark candidates.

Once a benchmark candidate is identified, then one must use benchmarking to learn what led to the superior performance. By the use of disciplined benchmarking we can find out HOW the benchmark candidate performs at such a high level. By discovering what process, or learning by what practice (best practice) a unit achieves benchmark performance, we can reap the benefits of benchmarking. The IG helps units in their

50

benchmarking efforts by identifying superior practices and publishing these practices for them to evaluate for adaptation to their performance improvement efforts.

Vision

General John M. Loh, a previous Commander of Air Combat Command (COMACC), had a vision of how he would like his command to have a central office for promoting benchmarking and collecting and spreading best practices to improve our combat capabilities. If one of his units developed a new best practice, he wanted an infrastructure in place, responsible for propagating that knowledge to other units. He then staffed a Tiger Team to look into the organization and provide a recommendation on how to best organize an office to accomplish his vision.

After much study and a change of command, the tiger team recommended to the new COMACC that Headquarters Air Combat Command develop an integrated product team (IPT) to address the challenge of managing the command best practices network. The IPT's charter was to work as an empowered cross-functional team to facilitate the crossflow of best practices throughout ACC active and gained units. Realizing that by its very nature, the Inspector General already had a cross-functional team in-place responsible for identifying command best practices during assessments and inspections, COMACC decided to cancel the IPT concept and improve the existing process already established to collect best practices. The ACC IG vision for collecting and spreading best practices was to increase access to and reduce the cycle time of getting best practices information to our units to help them improve their combat capability.

The ACC IG gladly took on this new role as it fit right into the existing mission statement:

IG Mission Statement

Air Combat Command's Inspection, Assessment and Oversight team educating, motivating, and independently evaluating.... to improve the capabilities of our Combat Air Forces.

During Quality Air Force Assessments (QAFA) and Operational Readiness Inspections (ORI), the IG team identifies functional area and cross-functional best practices. By collecting, publishing, and making these best practices readily available to our units, the ACC IG is fulfilling its new role as an educator/trainer. The "white hat" IG takes the responsibility of collecting and spreading best practices seriously. It has resourced four personnel positions from an already understaffed team and is using cutting edge technology (World Wide Web) to ensure our customers have access to the latest best practices information from internal and external sources. The ACC IG best practices branch was chartered to be the overall manager for collecting and spreading best practices and promoting benchmarking in ACC.

Charter

The role of the Best Practices branch is fivefold:

1. Publish and update command benchmarking guidance, ACCPAM 90-103, *ACC Benchmarking and Information Sharing Practices*

2. Conduct benchmarking training.

3. Maintain an electronic file database on ACC "best practices" (BP) and ongoing benchmarking studies on the World Wide Web (WWW).

4. Conduct limited data searches for ACC customers for public and private sector best practices.

5. Provide benchmarking consultant services for ACC customers.

While developing the command benchmarking guidance, the original Tiger Team explored many benchmarking process models from inside and outside the Air Force. They adapted the four phase benchmarking approach from the Air Force Quality Institute and incorporated the best characteristics from Air Force Material Command (AFMC), Air Force Reserves (AFRES) and several industrial models.

ACC IG developed three courses to aid in educating the command on the use of benchmarking as a performance improvement tool: (1) a Just-In-Time benchmarking course to prepare teams to effectively do a benchmarking study, (2) a senior leaders course to educate commanders on the benefits of benchmarking and how their units can use this powerful tool to drive performance improvements, and (3) a benchmarking awareness course teaching general concepts and an overview of the ACC best practices process.

Next, a trifold pamphlet was developed and given to our customers to advertise our new office's products, services, and capabilities to help them find best practices and benchmarking efforts.

The Challenge

The on-going QAFA/ORI process was the perfect opportunity to identify and collect innovative practices from process owners while we observed them in action. The challenge facing the IG community was how to improve its process of "getting the word out" to the rest of the command on best practices identified during these inspections. In other words, how could we best capitalize on our collective corporate knowledge and use it to help everybody get better. In his book <u>Strategic Benchmarking</u>, Dr. Gregory Watson emphasizes

the importance of the preservation of corporate learning. He notes that successful organizations place an emphasis on information technology to ensure wide dissemination of their acquired collective knowledge. This is what the ACC IG strives to do.

The Answer - An Evolutionary Process

First Generation Crosstell - (Reports)

As late as 1993, ACC IG published IG inspection reports via hard copy and there was no single source document for customers to review to find sources of best practices. The hard copy reports and their distribution method were slower and more costly than new electronic distribution methods. Motivated units searching for innovative approaches and trying to benchmark had to sift through these inspection reports to find best practices. This could be a timely process of separating the wheat from the chaff. At the beginning of the Quality Air Force movement, an internal assessment of IG crosstell documents revealed that the strongest utility of an inspection report was in identifying outstanding units/best practices that others could emulate to improve their performance. This is how the idea was born to dedicate stand alone documents to capture best practices and outstanding performers for crosstell to aid units in their benchmarking efforts.

Second Generation Crosstell - (Dedicated Publications Distributed Electronically)

The ACC IG then used an innovative approach to exploit existing and new technologies to spread internal best practices. Along with the exploitation of the Electronic Bulletin Board System (EBBS), the ACC IG simultaneously developed two new products.

First, we will look at how these new products increased the quality of best practices information to the field as well as reduced the cycle time to get the latest information to our customers. These new products also saved money in duplication and distribution cost.

The two new products were the **"QAFA TOP PERFORMERS AND BEST PRAC-TICES DOCUMENT"** and **"THE ACC ORI CROSSTELL DOCUMENT."** Both documents better serve our customers and assist them in their effort to benchmark best practices.

First we will discuss the **"QAFA TOP PERFORMERS AND BEST PRACTICES DOCUMENT."** During QAFAs, the IG identifies standards of excellence in each of the 24 criteria "items" from the Criteria for Air Force Assessments. Semi-annual analysis of the QAFA TOP PERFORMERS data with a one year look back keeps the database current. The command organizations with the highest score in each criteria item (identified in figure 1 by the triangle on the top of the line) are published with phone numbers to aid our units in their benchmarking and process improvement efforts.

QAFA COMMAND DISTRIBUTION

PERCENTAGE

CATAGORY / ITEM AREAS

AS OF 3 MAY 96

ROLLING 12 MONTH DATA
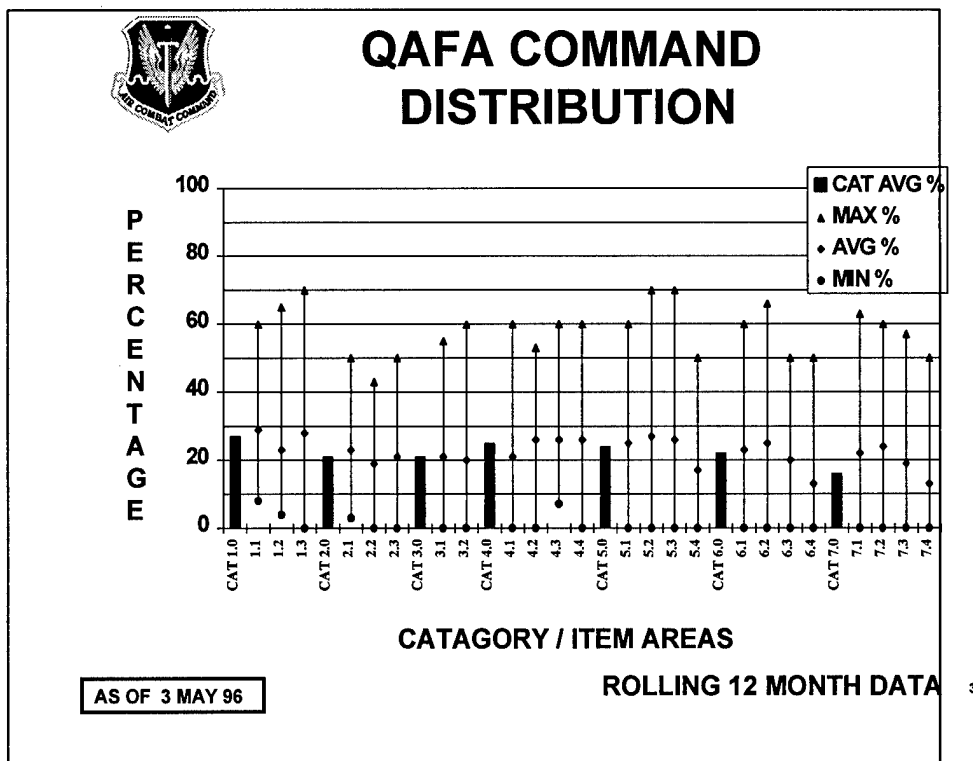
Figure 1

   Likewise, during our ORIs and QAFAs, we identify best practices. A best practice is a process worthy of command wide crosstell distribution. The IG is not in the business of identifying actual benchmarks. That is why the IG uses the term best practice to describe the outstanding processes it uncovers during the course of an inspection. Realizing that we only see one base at a time and as infrequently as once a year, we cannot accurately define the benchmark. These best practices are for other units to evaluate for their applicability and adaptability to their performance improvement efforts. Currently, ACC has over 600 Benchmark Candidate abstracts on file.

   Our second publication to promote benchmarking is the **ACC ORI CROSSTELL DOCUMENT.** It is an annual publication produced by the ACC IG Analysis branch and was first published in February of 1995. It is an analysis of the previous year's ORI reports. It highlights processes that received the five-tier rating of outstanding. The IG identifies these units to allow others to set up benchmarking studies with them.

   Starting in February of 1994, the IG has published the "QAFA TOP PERFORMERS AND BEST PRACTICES DOCUMENT" every 120 days and has made it available to our customers on the EBBS. Our ACC customers download an average of 50 copies per month. The ACC IG is always looking for new ways to do our business better, faster, and cheaper.

54

Third Generation - (Internet's World Wide Web)

In October of 1995, the ACC IG Best Practices Branch established a home page on the internet's World Wide Web. This new technology improves the access to our best practices information and gives us the ability to share more data with our customers on a given process. Anyone working from a computer within the (af.mil) domain has access to our command best practices. The ACC IG now has the ability to easily share its best practices with not only ACC units, but units from other MAJCOMs. The ACC IG best practices home page is receiving approximately 200 visitors per week.

The internet permits more information sharing. It allows us to leverage the knowledge that is available to share. For example, if a unit at base X develops a computer program that reduced their cycle time for mobility processing, the best practices branch contacts the process owner to obtain an electronic copy of the computer program. Then the computer program is attached to the best practice abstract on the WWW. A unit at base Y that is struggling with mobility processing during deployments or OREs can download the program, adapt it to fit its needs and subsequently improve their own mobility process. The vision is that everyone can get better faster by learning from others who have proven highly effective best practice processes.

Table 1 displays the evolutionary development process of our crosstell products and the mode of distribution and their customer utility, timely access to customers, and cost savings.

Generation	Better	Faster	Cheaper
1. Reports on Paper	Baseline data	Baseline data	Baseline data
1A. Reports on Electronic Bulletin Board	Electronic capability for distribution on bases' LANs	Hours vs. days	Saved $55,000/yr in paper and distribution costs
2. Best Practices/Top Performers/ORI CROSSTELL documents on EBBS	User friendly documents for researching best practices	Updated every 120 days for BMK candidates/Top Performers; yearly for ORI crosstell	Saved $5,000/yr in paper/distribution costs
3. Internet Home Page (WWW)	Can attach supplemental process details to increase information sharing and benchmarking data	Abstract on WWW within 5 days after report close-out	Saves time in accessing and collecting process details from other bases (library data accessible on-line)

Table 1

From Looking Inward To Looking Outward

Until January 1996, all of the IG best practices efforts were linked exclusively to the ACC IG inspection system. Efforts to link to other databases were made to expand our search for best practices. The ACC IG has funded an account with The Benchmarking Exchange' (TBE) which is a source of international best practices. Now, our ACC customers have access to world wide best practices data files. The ACC IG also plans to soon join the International Benchmarking Clearinghouse' to further our search for world class best practices. Also, our customers with internet now have access to the National Performance Review's BenchNet best practices files. For customers not yet on the internet, the ACC IG Best Practices branch can conduct some best practices research for them.

In October of 1995, the ACC IG expanded its search for internal best practices by inviting units from the field to submit potential best practices to share with others in their performance improvement efforts. As of June 1996, we have received four unit submissions and look forward to getting more as a result of unit level QIT and PAT efforts.

Figure 2 illustrates the best practices clearinghouse/repository concept that Gen Loh envisioned and that is a reality today. Also included is resource data you can use to research for best practices.
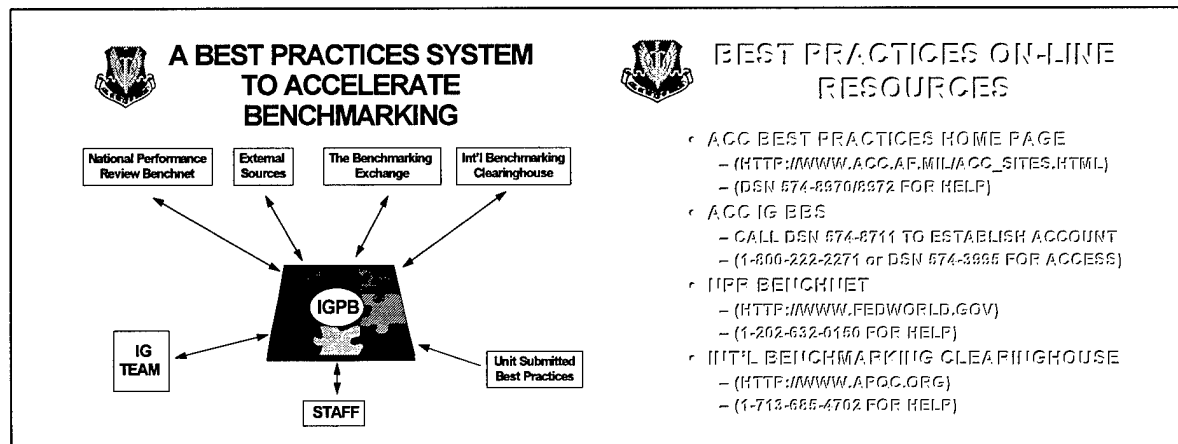
Figure 2

Where's The Beef - What's The Payback

Skeptics might say, "Hey, where is all this quality stuff taking us anyway?" The sharing of best practices, active benchmarking, and aggressive pursuit of excellence by our units point to where this "quality stuff" is taking us, and the vector is positive. Figures 3 and 4 portray data on the bottom-line results of the past four years' QAFA scores and overall ORI ratings respectively.

SQUADRON LEVEL QAFA SCORE AVERAGES

300
250 — 241
200
150
100
50
0
1993   1994   1995   1996

157   207   249

OF UNITS: 69   186   342   99

AS OF 3 MAY 96

2

Figure 3

ORI OVERALL GRADE

ACC
ACTIVE
&
GAINED

■ UNSAT ▨ MAR ■ SAT □ EXC ▨ OUT

P
E   80
R   70
C   60
E   50
N   40
T   30
     20
     10
      0
     CY93   CY94   CY95   CY96

AS OF 3 MAY 96   ('96Sample Size -- 9 Units)   1

Figure 4

57
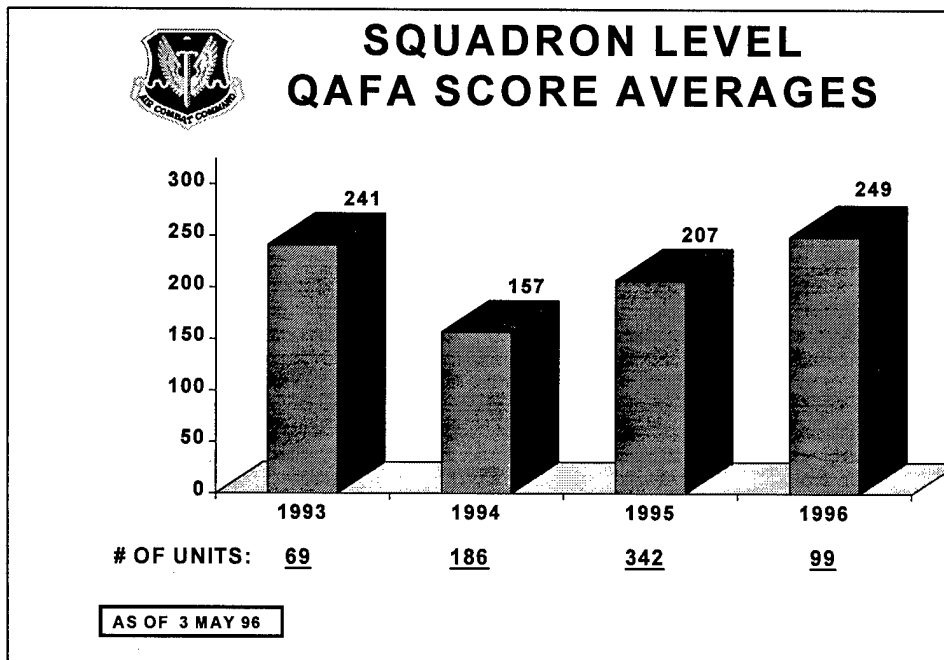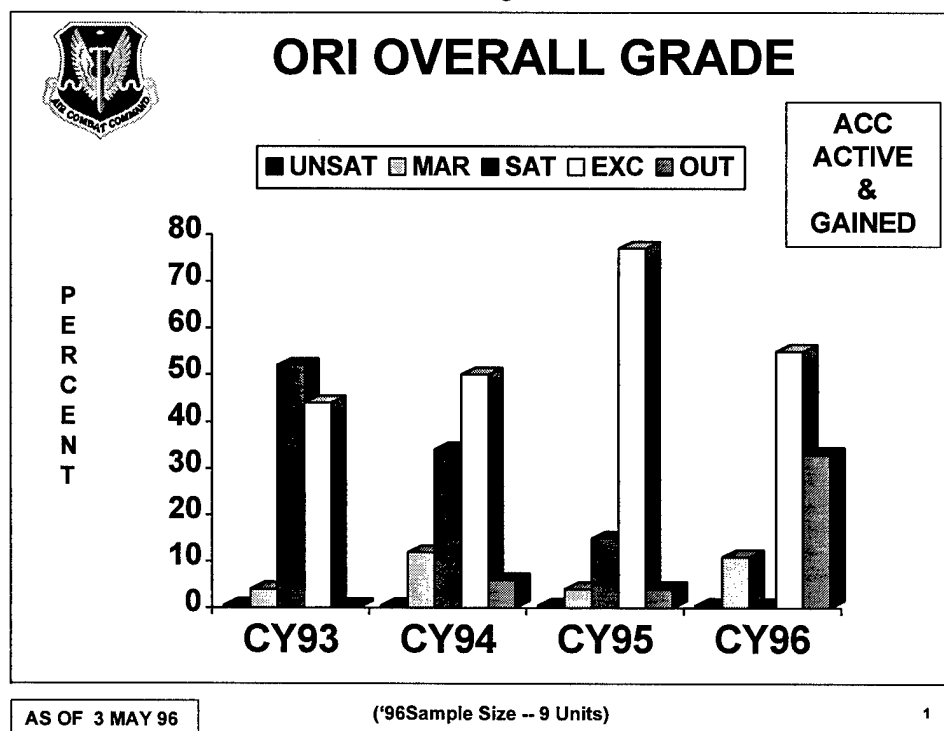
Conclusion

The ACC IG's use of innovation and new technology to collect and spread best practices along with our units' use of this data in their benchmarking efforts has contributed to the overall combat readiness of this command and the United States Air Force. There are many factors that go into the improvements in inspection results over the last few years. One factor is the unleashing of the human spirit to be innovative and creative at finding a better way to do our business of providing the best trained, equipped, and motivated airpower machine in the world. I will bet if you ask anyone who has received an ACC IG ORI in the past three years if the test or the grading criteria was easier than previous ORIs, the answer would be an emphatic NO. We at ACC IG believe that the spreading of best practices has had and will continue to have a positive effect on our combat capabilities. The exploitation of new technology has made this all possible. The disciplined use of benchmarking to identify and adapt best practices will keep us one step ahead of any potential adversary. *Hoshin Tenkai!*

References

Air Combat Command Pamphlet 90-103, *Air Combat Command Benchmarking and Information Sharing Practices*, 21 June 1995, p. 2.

Air Force Quality Institute's Basics of Benchmarking course handout, 1995, Appendix F-1.

Watson, Gregory H., Instructor and Managing Partner (1995) Advanced Benchmarking Workshop. Business Systems Solutions, Inc. p. 3-21.

Watson, Gregory H. (1993) Strategic Benchmarking New York, John Wiley & Sons, Inc., p. 87.

Log Off!

Capt Brian Max Dubroff

Capt Brian Max Dubroff is an instructor and organizational consultant at the Air Force Quality Institute. He informs and advises commanders and their advisors in processes to improve mission success.

Max graduated from the US Air Force Academy in 1989 with a Bachelor of Science degree in Organizational Behavior, and earned a Master of Public Administration degree in Human Resource Management from Golden Gate University, California in 1991. He selected the Security Police profession for the diverse leadership challenges. He made his mark upon the 60th Security Police Squadron and the 817th Munitions Support Squadron as a knowledgeable professional, versatile leader, and an inspiring facilitator of mission improvement.

As a core instructor of Quality Air Force (QAF) for a total of five years between Travis AFB, CA and Büchel AB, Germany, he honed the skills that now facilitate organizational improvement in various Air Force organizations at the executive level.

Log Off!

Capt B. Max Dubroff
AFQI/DO

Abstract

We are quickly learning the value of technology in our organizations. Unfortunately, we cannot learn quickly enough. The potency of our leadership depends upon it.

Two of the most tragic mistakes that we make in our organizations are born of paradoxical misunderstandings of communication technology's benefits. First, failing to maximize the extent and means by which technology can facilitate communication and make the environment for innovation fertile. Second, not understanding the limits and means by which technology can*not* facilitate communication and make the environment for innovation fertile.

The main thrust of this paper is that leaders need to "log off" of their computers and be involved with people—in- and out-side of the organization. The underlying thrusts are that leaders need to first "log on" to learn and use communications technology, and then have a plan of action for getting the most benefit for the organization out of "logging off."

Log on. Maximize the benefits of technology. Then, log off! For the love of your people and innovation, LOG OFF!

Disclaimer

Boot Up

The greatest leaders have conquered one of the toughest challenges we face in our organizations: being expert communicators. Max DePree, in *Leadership Jazz*, gives the straight line on communication, "I learned that if you're a leader and you're not sick and tired of communicating, you probably aren't doing a good enough job." (p. 100). Great leaders understand the impact that communications technology can have in our organizations and capitalize on it. They also understand the unmatched effect of demonstrating commitment to others through personal communication. Additionally, they are involved and supportive of innovators and communicate a vision to actualize the growth toward the future.

For each of these main concerns, I will provide examples from the proven leadership of President Abraham Lincoln and illustrate the timelessness of each.

Log On

As president, Lincoln exploited communications technology. Donald Phillips clearly stated this point early in *Lincoln on Leadership,* "He virtually lived at the War Department's telegraph office so he could gain access to key information for quick, timely decisions." (p. 13)

In *Leadership is an Art*, Max DePree reminds that this challenge has evolved:

> With large organizations spread out all over the world, we must have additional ways to communicate besides behavior, especially to communicate intangible and crucial and fragile information to widespread groups of people. (pp. 101-102)

It would be fair to state that the US Air Force epitomizes this description. Our leaders communicate to their people throughout bases and wings, out to remote and geographically separated sites, and across the entire USAF. To enable this, we already do many things that capitalize on communications technology, which reduce the costs for travel—local, regional, or intercontinental—and time away from the office. The three major categories of communications technology which contribute the most are telecommunication, video, and (the one to which I will devote most of my effort) computer-supported.

Telecommunication is the key to the most common communication methods we employ. Facsimile technology further aids the transfer of information for routine daily issues. It has the added benefit of being communication on paper—a more familiar medium.

With video, we touch more people and organizations with a single reach. Better yet, each person gets the message directly from the leader's mouth, eliminating misinterpretations caused by repeated translations. Organizations can even store videos for future reference, providing a memory of the message. With video teleconferencing, meetings are being held across oceans via satellite, reaching knowledgeable solutions that previously were impractical because of outrageous cost.

Computer-supported technology is causing a revolution in what we consider to be "everyday stuff." Even when required to work away from the office, technology keeps us in business. Through e-mail, office maintenance tasks (distribution, guidance, direction, etc.) can be done anywhere—commonly known as the virtual office. The user can spend more face-to-face time with customers and suppliers and still be available for others (customers, suppliers, superiors, peers, subordinates, and team members).

More than 7.6 million Americans telecommute. . . .By 2000, 57 percent of the U.S. work force will telecommute, according to John Vivadelli of Technologies International Corp., a Richmond, VA consulting firm. (Fertig, p. 35)

When I arrive in San Antonio or Boston or wherever, and I need to sit down and do my e-mail, I just use any room that's available. — Hatim Tyabji, CEO of VeriFone (*In Pursuit of WOW!,* p.251)

It is key to note that Hatim Tyabji is himself using the technology. Many who find the transition to computer technology difficult continue to have their secretaries read all of the electronic messages, then print out the "important" ones to put in the boss' in-basket.

You can only use e-mail . . . if you do it yourself, if you're available to any-body and everybody. The elimination of the screening process in my e-mail . . [leads to] a more democratic way of operating. . . . — Andy Grove, CEO of Intel (*In Pursuit of WOW!,* p. 258)

It led me to imagine a help wanted ad in, say, *The Economist* in 1999:

> CEO, Lrg. multinat. Must type min. 90wpm. Other rqmts. optional.

Maybe even that's not a fantasy. (*Tom Peters' Seminar,* p. 180)

The communications technology of the virtual office also generally helps reduce over-head costs and improve productivity. For the self-motivated members of the organization, leadership's biggest concern becomes burnout of their personnel.

People actually tend to work longer. They have to be taught when to stop working. . . .In a study sponsored by the AT&T Foundation, Grantham [Presi-dent of the Institute for the Study of Distributed Work] found that virtual office or distributed work programs helped organizations increase productivity by an average 15 to 20 percent. (Thomas, p. 82)

This increased productivity is the result of breaking out of restrictive paradigms. Instead of limiting our use of technology to the frameworks or methods which currently exist, we need to explore new ways to employ the tools toward improving our mission accomplish-ment. In other words, your pentium chip does more than spell-check!

To enhance our meetings, computer supported collaboration programs (known as groupware) on a local area network offer anonymity, simultaneous and parallel processing, and full and immediate record keeping. Picture your meetings with notebook-size comput-ers in front of each person around the table, linked and driven by a single server computer. Each person types in their own ideas—practically eliminating those lost bits of information

while the person at the flipchart tries to remember how to spell common words. Everyone sees all of the ideas, without any knowledge of who submitted it. Picture the full participation of every team member, without the challenges created by quieter (and dominant) members of the group. Better yet, picture the members of the meeting sitting at desks in different locations linked together for the meeting by groupware—gaining immediate results from the virtual office.

To further maximize the benefits of technology, we need to get everyone "on-line." Realizing that the purpose of the communication is the message itself, not the process nor the people involved, we can reduce the levels of communication that are interpreting the message to death. Once again, we can thank Max DePree for the straight line, "Information is power, but it is pointless power if hoarded." (1989, pp. 104-105)

> Lincoln made himself aware of any and all new technological advances so they could be implemented first by the union. . . .He was quick and decisive in employing these new advances and made every attempt to get new weapons into his soldiers' hands immediately. . . (Phillips, p.141)

> At VeriFone, all new employees get the laptop computer of their choice before they get their desks . . . The company is wired from top to bottom. . . . People "tap in . . . or they die," one manager said, only half in jest. . . .Internal "p-mail" (paper mail) is outright banned at VeriFone. . . . (*Tom Peters' Seminar,* p. 180)

Without a doubt, we must get access to and understand technology. We need to look for new applications of the technology, from information access and key process monitoring to benchmarking and partnering.

Log Off to Connect with People

Do not become trapped into thinking that technology is the solution to all problems. Technology is a tool. Like every other tool, we must use it wisely. A knowledgeable person would not use a greasy hammer to fasten a battery in an expensive wristwatch. Conversely, a knowledgeable person would beware of forcing a technological answer into a very human problem.

> Overreliance on all this technology is one big pitfall. People can forget they're dealing with other human beings. . . .I think that it's crucial to realize that technology, like everything else in life, has its limits. — Hatim Tyabji, CEO of VeriFone (*In Pursuit of WOW!,* pp. 257-8)

> New technologies are the peerless enablers of [Hatim Tyabji's] bizarre organization—but dealing with the human factor is what makes it all work. It's 5 percent technology, 95 percent psychology. . . (*In Pursuit of WOW!,* p. 258)

Leadership cannot rely on technology in place of needed human interaction. "At the core of becoming a leader is the need always to connect one's voice and one's touch." (DePree, 1992, p. 3)

> Leaders are visible. They do not sit safely in an ivory tower, whether the tower is on a campus or in a corporate headquarters. Leadership is not an arm's-length proposition. (DePree, 1992, p. 146)

Donald Phillips' examination of Lincoln's style also emphasizes the people before the technology. In the first line of the book, he provides a metric: "During his four years as president Abraham Lincoln spent most of his time among the troops." (p. 13)

Unfortunately, not everyone gets it. I have seen some people e-mail a message to the office next door instead of getting up and going around the corner. Their common anthem becomes, "I used it because it was there." There are numerous situations in which this technological answer does not fit.

> I've learned the hard way to send only two kinds of messages—neutral, such as "I'll meet you at 2 p.m." or praise. I won't use e-mail for anything that even hints of being negative or critical. The potential for miscommunication is too high. People read into the slightest negative comment all kinds of other emotions. It's not worth the risk. — Frank Becker, Director of International Workplace Studies at Cornell University (Thomas, pp. 57, 82)

As the conveniences of technology become more common and comfortable, it will require more effort for face-to-face communication. Is it worth the effort? Consider this. Do we hear people talk about the boss (or subordinate, or peer, or customer) who e-mailed them? Not often, but they will talk forever about the thank-you note (handwritten), the handshake, or the office visit. They will never forget it because they *see* the investment you have made in them.

Well-intentioned surveys have been conducted throughout our organizations. One of the most frequent and significant topics of concern has been recognition. After learning this, large investments have been made to attempt to create the perfect recognition system. Consistently, the efforts have uncovered the *real* concern along the way: people want to be visited and appreciated—they do not want a system or program.

Allow me to give an example. As a Security Police officer, I have spent many hours visiting people who work very lonely and boring posts. They talk. That's all they have. Inevitably, someone will mention a positive interaction with someone (superior, subordinate, peer, or customer). It does not matter how current the referenced interaction was; it matters only that it happened. For instance, an Airman once filled the silence with, "The Colonel's visit went well."

Anyone could predict the next thing that happens. The rest of the people will work to "one-up" the last example. This goes on for a long time, resulting in everyone sharing the joy of that positive interaction. By the end of the conversation, every one of the six of us had related at least one story. . .and everyone heard <u>all</u> of them.

Another example—from an acquaintance of both people involved—was one of a brigadier general. One day, the fleet services person was preparing to clean up the aircraft when the long shadows of the day announced the approach of someone from behind—the general.

This leader, who was about to take command of a wing, was not fully familiar with the specific mission that his people performed. He inquired as to what the fleet services entailed. Half skeptically, the employee recommended that he put on some latex gloves and follow her, as they start with cleaning out the aircraft's toilet. He did! He learned, first hand, an important part of the support structure for the mission. More significantly, everyone has a deepened respect for him.

End result: the short-term cost involved in personal involvement and recognition is hidden by the tremendous—and almost mythical—benefits. Again, is it worth the effort? It seems far more effective than the best World Wide Web site homepage.

Log Off to Innovation

Technology can surely aid in speeding innovative ideas around the organization; but it can never substitute for the creativity of the human mind. It is there that leaders need to focus their attention.

Unfortunately, because the USAF has very loyal customers, some people do not see the need for innovation. We must beware of confusing past successes and present capabilities with future requirements.

> It is good to have loyal customers. . . .but it will not suffice. . . .There was a time when a radio depended on vacuum tubes. . . .Makers of vacuum tubes improved year by year the power of vacuum tubes and made them smaller and smaller. Customers were happy, loyal. Came along, however, the work of William Shockley and others in the Bell Telephone Laboratories on the diode and transistor effect, which led to the integrated circuit. Happy customers of vacuum tubes deserted vacuum tubes and ran for the pocket-radio. (Deming, pp. 8-10)

After we embody the desire for innovation, we then must plan how to get the ideas working for us. To make the organizational environment fertile for innovation, the first key is leadership involvement and support.

By being available, the leader can provide others the big picture of innovation linked to the organization's vision and strategy. As Max DePree stated in *Leadership is an Art*, "The best way to communicate the basis of a corporation's or institution's common bonds and values is through behavior. . ." (p. 101) By being available, the leader can also gain access to some of the most brilliant innovative ideas. Peters and Austin provide further insight to this most overlooked answer:

> Management by Wandering Around (MBWA): It is being in touch, with customers, suppliers, your people. It facilitates innovation, and makes possible the teaching of values to every member of an organization. . . .Leading is primarily paying attention. (pp. 31-32)

By wandering around, we are also available to innovative ideas—the ones not yet thought through. Most of these never surface in our organizations because the innovator sets the ideas aside due to lack of confidence. It is that simple; they do not want their ideas criticized.

> Leaders are accountable for the continuous renewal of the organization. . . Renewal also requires that leaders be alive in a special way to innovation and be hospitable to the creative person. (DePree, 1992, p. 31)

Our organizational structures are another barrier to innovative ideas. The typical idea submission process gives access to the idea to more people than the intended recipient (potentially even someone that the person does not trust). For this reason, people may become more inhibited when it comes time to make some "mistakes." The end result of this dynamic is limited ideas for the leader who needs them.

In order to gain the knowledge we desperately need, we cannot rely solely on our current organizational structures.

> The lumbering bureaucracies of this century will be replaced by fluid, interdependent groups of problem solvers. . . . — Texas Instruments' Steve Truett and EDS's Tom Barrett (*Tom Peters' Seminar,* p. 151)

> VeriFone's organizational model is the blueberry pancake—independent units (blueberries) held together by a unifying medium (batter). We are completely decentralized and expect each blueberry to generate its own ideas, strategies, and tactics. — Hatim Tyabji, CEO of Verifone (*In Pursuit of WOW!,* p. 250)

The blueberry pancake model may not be quite right for every organization in the USAF; but there are organizations within the USAF that could perform their missions far better and more innovatively by *de*structuring—instead of the more pervasive restructuring. One successful example of this is the application of centralized control and decentralized execution of airpower during Operation Desert Storm.

Col John Warden, architect of the Instant Thunder air campaign which was phase one of Operation Desert Storm, addressed my Squadron Officer School class on 28 May 1996. He related that Desert Storm demonstrated the need and power of parallel warfare—coordinated attacks upon multiple centers of gravity. Parallel warfare is enhanced by technology, but cannot be employed properly through methods designed for serial warfare—the WWII approach of concentrated attacks upon single centers of gravity at a time.

> The old hierarchical organizational systems are too slow and cumbersome to meet the needs of parallel war where things happen in minutes which took weeks or months in the old serial world.. We require flexible organizations with flexible communications and organizations which make parallel war possible and which allow us to prosecute it in ever shorter time frames. — Col John Warden (electronic message, 4 June 1996)

Far more exciting than my conservative estimate of the need for some organizations to destructure, isn't it?!? Though already a success, the opportunity for further improvement is ripe. With the right environment, we can also nurture innovation.

> The more contemporary thinking of Tom Peters fits right in with Lincoln's leadership philosophy. Peters, in Thriving on Chaos, advocates turning everyone into an innovator by "supporting committed champions, modeling innovation, and supporting past failures." (Phillips, p. 139)

"Failures?" There will be *failures*?! Yes, many of the ideas will not achieve expected levels. But, these are small failures on the path to breakthrough improvements. The only other choice is to wait around for catastrophic failure.

> Inevitably there were failures, but Lincoln had great tolerance for failure because he knew that if his generals were not making mistakes they were not moving. . . .he tended to stand by his commanders, offering them support and giving them encouragement. After the first battle of Bull Run, Lincoln visited Gen. Irvin McDowell and told him: "I have not lost a particle of confidence in you." He did the same thing with Burnside after Fredericksburg, Hooker after Chancelorville, and Grant when he stalled at Petersburg after the Wilderness campaign. In each case Lincoln visited his defeated general in the field and offered his full support. (Phillips, p. 138)

This does not imply that we just deal with whatever comes along. Sometimes there is just a lack of a good person-job fit. Leadership has to stay involved to provide vision, encourage, and ensure that it is only small mistakes which are not being repeated. Lincoln demonstrated this through the many generals he relieved of their duties, mostly due to inaction.

The second key to innovative ideas is typically just out the front door. Benchmarking other organizations with similar processes has unmatched potential.

> Do your homework first. If you use a master only to help you learn the basics you will gain less from your contact with them and you will have used up some of their goodwill for little purpose. (Hutton, p. 238)

The other keys to innovative ideas are existing customers and suppliers. Both with them and benchmarking, the two-way relationship creates more winners.

> Customers are always the primary source of information about what aspects of your products and services need to improve—and whether your efforts to improve are working. . . .Suppliers can help you understand how to make better use of their products or their particular technological expertise. . . .you already have a relationship and a reason to help each other (Hutton, pp. 238-239)

The common bond through the three methods of getting innovative ideas is *people*. No communications technology can substitute for the trust gained through the personal touch.

Reboot

As this section title suggests, logging off is not final. There needs to be a balance that ensures that the leadership is helping the organization achieve its potential.

To achieve our potential, leaders face three main challenges in their organizations. The first challenge is to ensure that we stay on the edge of the envelope with communications technology. It changes daily, and leaves many behind.

The second challenge is to stay in touch with the human side of our organizations. Remember that technology is merely a tool to connect great minds together. The minds are that unsubstitutable ingredient.

The third challenge is bound around the fact that the people you stay in touch with are the ones from whom you will get the innovative ideas. In every direction and way, there is another idea waiting for a leader to nurture it. Are you going to get these—quiet, but mighty—innovative ideas working in your organization? Continued mission success depends upon your energy as a leader today.

Credit Where Credit Is Due

Works Cited

Deming, W. Edwards. 1994. *The New Economics*. 2nd Ed. Massachusetts Institute of Technology Center for Advanced Engineering Study, Cambridge.

DePree, Max. 1989. *Leadership is an Art*. Dell Publishing, New York.

DePree, Max. 1992. *Leadership Jazz*. Dell Publishing, New York.

Fertig, Judith. "Remote Control" *Ingram's*. May, 1995, pp. 34-35, 59-61.

Hutton, David W. 1994. *The Change Agents' Handbook*. ASQC Quality Press, Milwaukee.

Peters, Thomas J. and Nancy K. Austin. 1985. *A Passion for Excellence*. Random House, New York.

Peters, Tom. 1994. *The Tom Peters Seminar*. Vintage Books, New York.

Peters, Tom. 1994. *The Pursuit of WOW!* Vintage Books, New York.

Phillips, Donald T. 1992. *Lincoln on Leadership*. Warner Books, New York.

Schwarzkopf, General H. Norman and Peter Petre. 1992. *It Doesn't Take a Hero*. Bantam Books, New York.

Thomas, John B. "Virtually at Work" *World Traveler*. March, 1996, pp. 52-57, 82-83.

Warden, Colonel John, USAF, Retired. *Air Power in the Gulf War*. 28 May 1996. Address to Squadron Officer School Class 96-D, Maxwell AFB, AL.

70

TQM: Manufacturing Vs. Services

1st Lt E. Karen Eckerle   Capt George Vukotich

E. Karen Eckerle, MSM, has been actively involved with Total Quality Management curriculum development, instruction and facilitation since 1992. Her Master's thesis, "Total Quality Management and Computer Literacy in the Department of Defense" contributes to her current interests in Strategic Planning and Process Mapping with the US Air Force Reserve. A member of the American Society for Quality Control, Karen holds a certificate in Quality Assurance and has recently completed ISO 9000 Quality Auditor certification.

George Vukotich Ph.D. focuses on working with organizations to help them become more successful. His research focuses on Strategy and Organizational Development. He has worked for organizations which include Arthur Andersen, IBM, American Express, and Booz, Allen and Hamilton. George teaches at the college level and is a member of the United States Air Force Reserve where he facilitates TQM and SPC programs. He can be contacted at 312-277-2232.

71

TQM: Manufacturing Vs. Services

1st Lt E. Karen Eckerle
Capt George Vukotich
928th Airlift Wing
O'Hare IAP-ARS, Chicago, IL

Abstract

With services making up over 80% of the US economy, it is important to understand the difference between applying traditional Total Quality Management (TQM) principles designed for a manufacturing environment and how we can apply TQM and the measurements of the metrics process to the service environment. Applying manufacturing models to the service environment may lead to creating metrics that do not tell the true story. It is important to not just convert the manufacturing process to a process for services, but rather to look at the adaptation of the process and what it means to the ultimate customer. The authors look at services and propose ways to measure customer satisfaction in a services-oriented environment. One of the examples the authors cite is the concept of the 10 minute oil change business. They look at how the concept came about, what the customer is getting, and why individuals choose the 10 minute oil change over the alternatives. Changing our frame of reference and looking at things from a customer perspective can lead to new and effective ways to apply TQM to the services environment.

TQM: Manufacturing vs. Services

There is currently a major debate as to whether TQM applied to services is the same as that applied to manufacturing. The authors believe the goals of TQM are the same whether the principles are applied to the services or manufacturing areas of an organization. What is different is how to reach these goals. To begin, let's look at the primary goals of TQM which include:

- SATISFYING CUSTOMERS
- INCREASING REVENUES
- LOWERING COSTS
- EMPOWERING WORKERS

Traditional Manufacturing Model

The traditional manufacturing model looks at quality at the end of the production cycle. Products are checked to see if they meet certain specifications and are within certain tolerance limits. If the product passes this test it is passed on to the customer. If not, the product is scraped. The costs with such an approach are very high. From the cost of materials put in the product to the cost of labor spent after the product is past the point of rejection.

There is also the psychological effect on worker's perception of how work should be done. In the traditional model workers feel they are required to perform a task and not have input into how things should be done. They are simply an extension of the machinery they work with. A problem with the traditional model is that when the finished product reaches the end of the assembly line only a sample is inspected not every item. This is due to a number of logical reasons; time to inspect, cost to inspect, and in some cases the fact that testing for quality destroys the actual product. All this left the chances of a defective product going to a customer quite high.

New Manufacturing Model

The traditional manufacturing model has evolved from checking quality of output to a new manufacturing model focused on building quality into the production process. Organizations no longer wait for the product to come off the assembly line before making decisions to accept or reject a product. Workers have been empowered to not only pull bad products off the line during the process but also tohave input in how to make the process and the resulting product better. Employees are no longer just extensions of the machinery, they are empowered and expected to make decisions into how things should be done (Scully, 1995).

Services Model

It is harder to find a traditional services model since little if any attention was paid to areas such as customer service, sales, and customer follow-up prior to the last few years. The American economy has shifted from mass production shortly after World War II to one of mass customization where the wants and needs of the customer are taken into consideration often before the final product is produced. A different approach must be used in dealing with each customer as an individual and not as a group. The early 1990's showed a number of traditional service type industries; banking, hotels, airlines, and healthcare try to gain a competitive advantage by focusing on quality. Airlines for example, shifted from just moving people to focusing on what people encountered as they were moved and how to make the process more enjoyable. Today almost 80% of all workers in our society are focused on the services economy. The availability of information and the capability of technology have also been major contributors in the shift to a services society.

73

PRODUCT CHARACTERISTICS	SERVICE CHARACTERISTICS
• Customer receives a tangible	• Customer receives an intangible
• Goods can be evaluated before purchase	• Services are difficult to evaluate before delivery
• Production and delivery of goods are separate	• Services are consumed at the point of delivery
• Few producers deal with customers directly	• Service providers deal directly with customers
• Sales channels involve more levels	• Sales channels have few levels
• Quality of goods is relatively easy for customers to evaluate	• Quality of services is more subjective and difficult to evaluate
• Various brands can be easily compared	• Harder to compare different service providers
• Goods can be complex making it more difficult for the customer to understand usage	• Services appear less complex and therefore the customer feels more qualified to judge a service
• Defective goods can be fixed/replaced	• Defective services cannot easily be fixed/replaced

Table 1

Differences

First, it should be noted that customers today, of both products and services, are much more aware of what quality is. They have higher expectations than in the past (McDonnell, 1994). Manufacturing products is generally capital intensive and requires equipment to produce the final product. Customers usually do not see a manufactured product until it is complete. Given this customers often rely on brand or company reputation. With services there is a higher emphasis on an individuals capability and the interpersonal and communications skills that a person has. In addition the customer is often involved as the process is taking place and as such may not place the same value on the service as the person performing it. The input and procedures involved in service delivery have more variability than the raw materials and procedures in manufacturing a product. It is important to understand processes in order to improve them. In a services environment this is more difficult. It should also be noted that often the individuals who provide the service see themselves as having the unique skill set and only work for an organization as a matter of convenience. Because of their skills they can quickly change the organization they work for, if they choose to work for an organization at all.

The service business is primarily a people business. Too few service organizations create a sense of purpose and excitement among their employees. Organizations have a tendency for the first point of contact with a customer to be the lowest-paid employees in the organization. Executives and decision makers are remote from the marketplace and as a result may be slow to react to changing customer perceptions (MacDonald, 1994). The key difference in the services area is that you may not have an opportunity to fix a service. There is usually a direct impact on the customer at the point of service. Service delivery is decentralized with the actual work being performed at the customer site. Manufacturing is usually

done at a fixed number of locations and therefore has less variability attributed to environmental factors. The table below shows some differences related to centralized and decentralized environments.

CENTRALIZED — MANUFACTURING	DECENTRALIZED — SERVICES
• Automated, Machinery	• Physical, Human
• More capability to control	• Less capability to control
• Less probability of variation	• Greater probability of variation
• Tangible factors	• Intangible factors
• Processes more defined	• Processes not as well defined

Table 2

Steps

Whether you're producing a product or performing a service there are certain steps that must be considered before, during, and after the creation of the product or delivery of the service. The key question to ask is "Is this something my customers see value in" (Scully, 1995).

1. Identify Customer Needs & Expectations. Useful tools to help in this process include:

   • Conducting focus groups studies
   • Conducting mail surveys
   • Conducting telephone surveys
   • Examine data related to customer complaints

Product Example: *Produce a car that does not need a tune-up for 100,000 miles.*

A recent example is what some automobile manufacturers have done. Build cars that can go 100,000 miles before tune-ups. If we examine this product and the marketplace we find that most new car owners sell their cars before reaching 100,000 miles. This has in effect told new car owners that they never need to worry about a tune-up.
SERVICES EXAMPLE: Perform an oil change in 10 minutes or less.

Most manufacturers recommend changing a cars oil every 3000 miles. This was far to often for many individuals who did not want to spend hours at a dealer waiting to get their oil changed. As a result over the last few years a new industry has developed, quick change oil shops have given customers a service that provides them with a time and cost saving, not just an oil change.

2. Develop Organizational Systems & Procedures To Meet Customer Needs and Expectations. Once customer needs and expectations have been identified methods must be developed to help meet these expectations. Useful tools include:

- Flowcharting current processes
- Identifying areas for improvement
- Brainstorming ideas
- Generating potential solutions
- Developing performance support systems

Product Example: *Examine the process of the automobile assembly line.*

Once automobile manufacturers had to keep large quantities of component parts in stock as the process of building automobiles. Items that ranged from tires to windshields. Today thanks to the concept of Just-In-Time (JIT) manufacturers save millions of dollars in warehousing costs.

Services Example: *Allow for an easy to use order inquiry system.*

With the capability of telecommunications today a manufacturer can directly access a remote suppliers computer system to determine quantities and lead times for product delivery. This change in process of ordering has made the system cheaper and more efficient.

3. Produce Products / Deliver Services that Meet Customer Requirements. Useful methods include:

- Building quality into processes
- Monitoring customer satisfaction
- Continuously improving systems

Product Example: *Build cars meeting customers needs and expectations.*

There was a time when Henry Ford said a customer could have a car in any color as long as it was black. Imagine this approach today. In many cases before a car is even started the owner has identified and specified what they expect in the final product.

Services Example: *Customer service 24 hours a day, 7 days a week.*

Remember the days when if you wanted your car fixed it would have to be Monday through Friday, 8:00 a.m. to 5:00 p.m. Today progressive dealers and repair shops are learning that to make money you have to make it easy for the customer to do business with you. You can now get your car fixed just about anytime.

As we move more to a services economy organizations will need to more effectively monitor customer satisfaction. Organizations must learn how to change to meet customer needs. By partnering with their customers rather than just providing them with products and services organizations can differentiate themselves from the competition. Ability to change quickly and communicate effectively are two key areas that must be managed in order to be successful in the new economy.

References

MacDonald, John Service Is Different. <u>Perspective</u> Volume 6, Number 1, 1994, 45-49.

McDonnell, John The Route to Total Quality Management - Part Two. <u>Managing Service Quality</u> Volume 4, 1994, 45-50.

Scully, John P. How To Lead the Way to TQM <u>National Productivity Review</u> Spring 1995, 13-18.

"It's Time To Think About Values First"

Maj Jeffrey S. Stonebraker

Maj Jeffrey S. Stonebraker is a quality consultant for Headquarters Air Mobility Command. Prior to that, he taught at the Air Force Academy's Department of Mathematical Sciences 1988-1991 and 1994-1996. In 1988, he obtained his M.S. degree from Stanford and his Ph.D. degree from Arizona State in 1993. From 1983-1987, he was a ground-based radar test engineer at Hill AFB. Since 1987, he has consulted for the Departments of Defense and Energy, and private industry.

"It's Time To Think About Values First"

Maj Jeffrey S. Stonebraker
HQ AMC/QI
Scott AFB, IL

Abstract

In today's restructuring and downsizing environment, organizations need to first determine where they want to be in the future rather than thinking of the many different paths to get there. By clearly focusing on where they want to be in the future, organizations can reap the benefits of creating opportunities that they wouldn't have even considered before. Besides creating opportunities, communication within organizations is significantly improved when organizations focus on what's important to them in the future. Focusing on what's important is called "value-focused thinking." Values are important to organizations and the paths are just a means to achieve these values. In this paper, value-focused thinking was used to assist Los Alamos National Laboratory in capturing what various stakeholders in the Lab believed to be important in the design and development of a safety capsule to minimize inadvertent detonation of the Navy's W76 nuclear warhead.

Introduction

This paper is organized as follows: First, we motivate value-focused thinking through the base closure and realignment process (BRAC) used by the Air Force in 1993 and 1995. Second, we discuss value-focused thinking and illustrate its principles with an application to Los Alamos National Laboratory. Finally, we describe the benefits of value-focused thinking for the Lab.

Motivation from BRAC

In compliance with Public Law 101-510, the Government Accounting Office (GAO) provided an independent assessment of the Air Force's BRAC selection process. The GAO noted several improvements to the 1995 BRAC round from prior BRAC rounds (United States 1995), but there were still problems. Specifically, the Air Force's selection process remained largely subjective and not well documented (United States 1995). As a result, the GAO questioned many of the Air Force's recommendations (United States 1995):

> *Documentation of the Air Force's process was too limited for GAO to fully substantiate the extent of Air Force deliberations and analyses. (p. 5-12)*

During the 1993 BRAC round, the GAO expressed similar concerns to the Air Force's selection process (United States 1993):

> Although the Air Force process appeared reasonable and the data used generally accurate, the GAO found the process difficult to verify and noted some judgments which were not clearly documented. In some cases, Air *Force decisions could not be verified using existing documentation.* (p. 3-14)

In 14 of the 31 bases the Air Force evaluated for closure and realignment, the BRAC Commission found that the Air Force deviated substantially from the military value selection criteria. Besides the BRAC Commission's findings, the communities of some of the bases being considered for closure or realignment also expressed concern about the Air Force's selection process. For example, one community expressed the following concern (United States 1995):

> *The community also questions the Air Force's military value analysis. They argue the analysis is unauditable, the Air Force relied on "military judgment," and the approach was undocumented. Community representatives believe the Air Force's analysis is flawed because the Air Force violated its guidance and the decision-making process was subjective. They note the General Accounting Office supports the conclusion that the Onizuka AS rating was arbitrary.* (p. 1-87)

Another community expressed the following (United States 1995):

> *The Community expressed concern the Air Force military value was subjective. The Commission agreed that the determination of military value is complex and difficult to translate into easily auditable numbers.* (p. 1-108)

In summary, many groups and individuals concluded that the current Air Force BRAC selection process was largely subjective, not well documented, difficult to verify, unauditable, and resulted in arbitrary ratings. Unfortunately, the reality is that determining military value is complex and difficult to translate into auditable, defensible numbers.

However, the good news is that people have been doing value analyses for many years. In fact, probably one of the earliest examples was Benjamin Franklin, when he was considering the pro's and con's of decisions back in the 1700s (Franklin 1772). Recent applications include: Buede (1986), Edwards and von Winterfeldt (1987), Keeney (1988), Keeney, von Winterfeldt, and Eppel (1990), Keeney and McDaniels (1992), and Keeney (1994).

Applying Value-Focused Thinking to Los Alamos National Laboratory

Value-Focused Thinking is a quantitative, systematic process that provides the framework to make logical and defensible decisions consistent with what the stakeholders value, know, and can do. This process involves four basic steps:

Step 1: Frame stakeholder values,
Step 2: Formulate measurement scales,
Step 3: Determine relative importance, and
Step 4: Compute overall rating.

The following example illustrates these steps: Nuclear weapons research and development has been the central mission for Los Alamos National Laboratory since it's development of the first atomic bomb during the Manhattan Project over 50 years ago. In response to a changing world, the Lab recently redefined its mission as helping to reduce the global nuclear danger by ensuring the nation has a high level of confidence in the safety, security, and reliability of its nuclear stockpile in the absence of nuclear testing (Hecker 1994).

To accomplish this mission, the Lab was considering the design and development of a safety capsule to minimize inadvertent detonation of the Navy's W76 nuclear warhead. In general, the safety capsule would enclose the W76 and "protect" it from the external environment, yet not degrade the technical performance of the W76. The design of the safety capsule involved many stakeholders, e.g., primary and secondary bomb designers, engineers, physicists, chemists, etc. Direct involvement of these stakeholders early in the process was critical since they would be more willing to cooperate in a meaningful dialogue when design and development tradeoff decisions would have to be made later.

Step 1 (Frame stakeholder values): Since Los Alamos National Laboratory was organized by programs, we selected the safety capsule program manager as our initial interview since he was the most knowledgeable person in the Lab concerning the safety capsule and its possible impact on the Lab's mission. To help in the careful articulation of what the safety capsule program manager believed to be important, an objectives hiearchy was constructed. An objectives hierarchy or a value tree is a natural way to structure the objectives/values that a stakeholder brings to a decision. A value is what each stakeholder believes to be important whereas an objective provides a preferred direction of movement with respect to that value. For example, if we want to maximize profit, our value is profit and the objective is to maximize it. An important concept in constructing an objectives hierarchy is specification (Keeney 1992). Specification means that a higher-level objective is completely specified or defined by its lower-level objective(s). Besides specification, there should also be no overlap among the lower-level objectives. In other words, the objectives in a objectives hierarchy should be collectively exhaustive (cover everything that's important) and mutually exclusive (no double counting). Objectives should also be clearly defined so that the stakeholders have a common understanding of them. This is often referred to as the "clarity test" (Howard 1988). The objectives hierarchy should also be kept to a manageable level by only considering those objectives that discriminate among the alternatives. This is often called the "Test of Importance" (Keeney and Raiffa 1976).

We identified, with help from the safety capsule program manager, a list of stakeholders that we should interview. As we interviewed these stakeholders it became apparent that there were two key stakeholder groups: technical and management. The technical stakeholder group consisted of bomb designers, engineers, physicists, technicians, chemists,

programmers, and analysts. The management stakeholder group consisted of other program managers, as well as the safety capsule program manager's supervisors. The technical stakeholder group was primarily concerned about the engineering design of the safety capsule, whereas the management stakeholder group was interested in the bigger issue of how the safety capsule program could meet the Lab's new mission.

With the safety capsule program manager's objectives hierarchy in hand, we then interviewed each stakeholder and asked them what they believed to be important relative to their view of the safety capsule being able to reduce global nuclear danger. This permitted a free flow of ideas. As the ideas came, we constructed an objectives hierarchy for each stakeholder. Only after the stakeholder's objectives hierarchy was completed did we show them the safety capsule program manager's objectives hierarchy. After fully explaining the safety capsule program manager's objectives hierarchy to the stakeholder, we then asked how we should modify this hierarchy to ensure that their objectives were included. We then modified the objectives hierarchy accordingly. Through this real-time modification of the safety capsule program manager's objectives hierarchy, we significantly increased the "buy in" of each stakeholder since their objectives were now included into the modified safety capsule program manager's objectives hierarchy. Once this was done, we discussed the new and improved objectives hierarchy with the safety capsule program manager. We then interviewed the next stakeholder by asking them what they thought was important relative to the safety capsule and the Lab's mission, developed their objectives hierarchy, showed them the current objectives hierarchy as modified from previous interviews, made necessary changes to the current objectives hierarchy, and reported back our findings to the safety capsule program manager. This process continued until we exhausted our list of stakeholders.

The Lab's objective hierarchy for the safety capsule program is shown in Figure 1. The highest-level objective is to *Maximize Safety Capsule Realization*. Safety capsule realization is further specified by the next lower-level objectives of *Maximize Design Objectives* and *Minimize Resource Consumption*. In other words, the best safety capsule realization maximizes the design objectives with the minimal amount of resources consumed. *Maximize Design Objectives* is completely defined by the next lower-level of objectives, *Maximize Surety* and *Maximize Performance*. *Maximize Surety* is defined by *Maximize Safety* and *Maximize Use-Denial Effectiveness*. *Maximize Safety* is defined by *Maximize Thermal Protection* and *Maximize Mechanical Protection*, whereas *Maximize Use-Denial Effectiveness* is completely specified by one lower-level objective, *Maximize Delay Time*. (Use-denial effectiveness is keeping nuclear weapons, materials, and knowledge out of the wrong hands, i.e., nonproliferation.) *Maximize Performance* is defined by *Maximize Improved Features* and *Maximize Confidence without Nuclear Testing*. *Maximize Improved Features* is further defined by *Maximize Lifetime Expectancy of the W76* and *Maximize Radiation Shielding*. Finally, *Minimize Resource Consumption* is specified by *Minimize Production Cost* and *Minimize Development Cost*.

Step 2 (Formulate measurement scales): Table 1 represents measurement scales for the lowest-level objectives in Figure 1. Measurement scales measure the degree of attainment of the lowest-level objectives in the objectives hierarchy and allow a non-subjective and unambiguous scoring of how well a course of action does with respect to each of these objectives (Kirkwood 1996).

For example, *Maximize Thermal Protection* in Table 1 is defined as the amount of Plutonium dispersed per year in kilograms if there is an accident. The measurement scale for thermal protection is a continuum of possible values from the best outcome of 0 (no Plutonium dispersed) to the worst outcome, a maximum (max) amount of Plutonium dispersed. Consequently, we want less (hopefully none) Plutonium dispersed if there is an accident, i.e., "less is better." The measurement scale for thermal protection is also a natural scale since it has a common interpretation. Similarly, the measurement scales for mechanical protection, radiation shielding, production cost, and development cost are natural, continuous, and less is preferred to more ("less is better"). The measurement scales for delay time and lifetime expectancy of the W76 are also natural and continuous except more is preferred to less, i.e., "more is better." For example, delay time is the time required for the "bad guys" to arm the W76 assuming they have access to it. The measurement scale for delay time is a continuum of possible values from the worst outcome of 0, that is, bad guys can arm the W76 without any time delays, to the best outcome of the bad guys taking a maximum (max) amount of time to arm the W76. Confidence without nuclear testing is also a "more is better" measurement scale except this scale is discrete with three constructed levels (high, medium, and low).

The statement "more is better" in Table 1 implies that there is some value in moving from one level in the measurement scale to another. But, how much value? For example, consider the confidence without nuclear testing measurement scale. If the increment in value in moving from low to medium is four times as great at moving medium to high, then the values are: $v(\text{low}) = 0$, $v(\text{medium}) = 0.8$, and $v(\text{high}) = 1.0$ when normalized between 0 and 1. These values along with the value increments for the other measurement scales are shown in Figure 2.

Step 3 (Determine relative importance): The relative importance or weight among the lowest-level objectives permits tradeoffs among these objectives so that they can be combined to obtain an overall rating for an alternative. As an illustrative example, assume that the weights for thermal protection (w_1), mechanical protection (w_2), delay time (w_3) lifetime expectancy of the W76 (w_4), radiation shielding (w_5), confidence without nuclear testing (w_6), production cost (w_7), and development cost (w_8) are: 0.25, 0.20, 0.10, 0.10, 0.15, 0.10, 0.05, and 0.05, respectively. As a result, thermal protection is the most important objective for the stakeholders while production and development costs are the least important. (Weights sum to one by conventional standards.)

Step 4 (Compute overall rating): The lowest-level objectives are then scored for each alternative by an evaluator using the measurement scales created in Step 2. For example, suppose thermal protection was scored at $\frac{max}{2}$ for a given design alternative, which has an increment of value of approximately 0.9, see Figure 2. Finally, these values along with the weights determined in Step 3 are combined to arrive at an overall rating using the following

equation: $V(x) = \sum\limits_{i=1}^{8} w_i \times v_i(x_i)$. The overall rating for this alternative is $V(x) = 0.6625$,

which is the sum of the last column in Table 2. This overall rating would then be used to rank order safety capsule design alternatives.

Conclusion

Initially, Los Alamos National Laboratory wanted to systematically structure the goals of the safety capsule program relative to its mission of reducing global nuclear. Consequently, value-focused thinking was used as a framework to incorporate what each stakeholder in the Lab believed to be important and contemplate design features of the safety capsule that they were not even considering previously. In addition, communication within and among the Lab's management and technical stakeholder groups was significantly improved. The overall objectives hierarchy was a compact and clear representation of what the Lab's stakeholders believed to be important in reducing global nuclear danger with the safety capsule. The value-focused thinking process of developing the overall objectives hierarchy forced stakeholders to clearly focus their attention on the important factors of the safety capsule program. This process also provided a common level of understanding for all stakeholders interviewed, as well as the different divisions within the Lab. Communication outside the Lab was also improved since the objectives hierarchy provided a way to clearly illustrate what the Lab believed to be important relative to its mission and the safety capsule program.

Maximize Safety Capsule Realization

Maximize Design Objectives

Minimize Resource Consumption

Maximize Surety

Maximize Performance

Minimize Production Cost

Minimize Development Cost

Maximize Safety

Maximize Use-Denial Effectiveness

Maximize Improved Features

Maximize Confidence without Nuclear Testing

Maximize Thermal Protection

Maximize Mechanical Protection

Maximize Delay Time

Maximize Lifetime Expectancy of the W76

Maximize Radiation Shielding

Figure 1. Objectives Hierarchy for Lab's Safety Capsule Program

Lowest-Level Objective	Definition	Measurement Scale
Maximize Thermal Protection (x_1)	Plutonium dispersed per year if there is an accident, in kilograms	continuous ("less is better") [0, max]
Maximize Mechanical Protection (x_2)	Plutonium dispersed per year if there is an accident, in kilograms	continuous ("less is better") [0, max]
Maximize Delay Time (x_3)	time required for the "bad guys" to arm the W76 assuming they have access to it, in hours	continuous ("more is better") [0, max]
Maximize Lifetime Expectancy of the W76 (x_4)	lifetime of the W76, in years	continuous ("more is better") [0, max]
Maximize Radiation ing (x_5)	amount of radiation exposure, in Rems	continuous ("less is better") Shield- [0, max]
Maximize Confidence without Nuclear Testing (x_6)	scientists' confidence in the W76 W76 modification not requiring nuclear testing	constructed and discrete ("more is better") high: no significant change in measurable and calculable performance medium: little change in measurable and calculable performance low: significant change in measurable and calculable performance, and nuclear testing would be required
Minimize Production Cost (x_7)	government facilities, outside facilities, and parts and processes, in dollars	continuous ("less is better") [0, max]
Minimize Development Cost (x_8)	testing and analysis, in dollars	continuous ("less is better") [0, max]

Table 1. Measurement Scales for the Lab's Safety Capsule Program
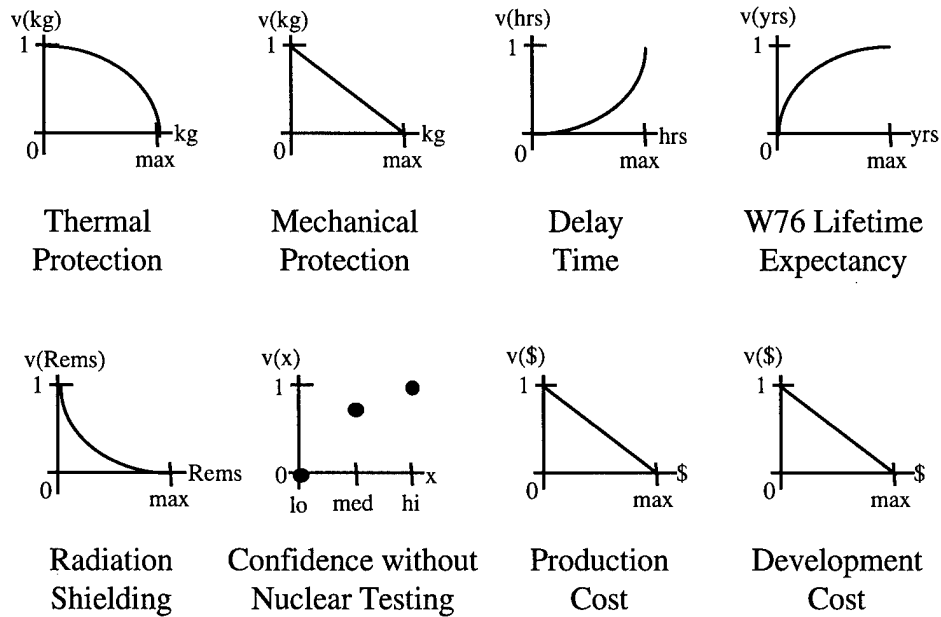
Figure 2. Examples of Value Increments for the Lab's Safety Capsule Program

Lowest-Level Objective	Score	Weight (w_i)	Value Increment $v_i(x_i)$	$w_i v_i(x_i)$
Thermal Protection (x_1)	$\frac{max}{2}$	0.25	0.90	0.2250
Mechanical Protection (x_2)	$\frac{max}{2}$	0.20	0.50	0.1000
Delay Time (x_3)	max	0.10	1.00	0.1000
Lifetime Expectancy of the W76 (x_4)	max	0.10	1.00	0.1000
Radiation Shielding (x_5)	¾ max	0.15	0.05	0.0075
Confidence without Nuclear Testing (x_6)	med	0.10	0.80	0.0800
Production Cost (x_7)	¾ max	0.05	0.25	0.0125
Development Cost (x_8)	¼ max	0.05	0.75	0.0375

Table 2. Illustrative Example for the Lab's Safety Capsule Program

Bibliography

Buede, Dennis M. "Structuring Value Attributes." Interfaces 16:2 (1986): 52-62.

Edwards, Ward and Detlof von Winterfeldt. "Public Values in Risk Debates." Risk Analysis 7 (1987): 141-158.

Franklin, Benjamin. "19 Sep. 1772 Letter to Dr. Priestley." The Works of Benjamin Franklin, Ed. John Bigelow, Vol. V. New York: The Knickerbocker Press, 1904.

Hecker, Sig. "Science Serving Society is More than a Motto." Los Alamos Newsbulletin, 10 Jun. 1994: 2 and 9.

Howard, Ronald A. "Decision Analysis: Practice and Promise." Management Science 34 (1988): 679-695.

Keeney, Ralph L. "Structuring Objectives for Problems of Public Interest." Operations Research 36 (1988): 396-405.

Keeney, Ralph L. Value-Focused Thinking, Boston: Harvard Press, 1992.

Keeney, Ralph L. "Using Values in Operations Research." Operations Research 42 (1994): 793-813.

Keeney, Ralph L. and Timothy L. McDaniels. "Value-Focused Thinking about Strategic Decisions at BC Hydro." Interfaces 22:6 (1992): 94-109.

Keeney, Ralph L. and Howard Raiffa. Decisions with Multiple Objectives: Preferences and Value Tradeoffs, New York: John Wiley and Sons, 1976.

Keeney, Ralph L., Detlof von Winterfeldt, and Thomas Eppel. "Eliciting Public Values for Complex Policy Decisions." Management Science 36 (1990): 1011-1030.

Kirkwood, Craig W. Strategic Decision Making: Multiobjective Decision Analysis with Spreadsheets, Belmont CA: Duxbury Press, 1996.

United States. The Defense Base Closure and Realignment Commission. Defense Base Closure and Realignment Commission Report to the President. Washington: GPO, 1993.

United States. The Defense Base Closure and Realignment Commission. Defense Base Closure and Realignment Commission Report to the President. Washington: GPO, 1995.

Using Technology To Enhance Organizational Analysis: A Case Study In Leadership Surveying

Ms Stacie L. L. Morgan   Maj Scott P. Morgan

President of Balanced Management, Inc., an organizational development firm specializing in organizational analysis and leadership development. Stacie has been an organization consultant for over 10 years, working nationally and internationally. She has extensive consulting experience with organizations such as Xerox Corporation, Chairs the Governing Board of the International Conference on Advances in Management, and represented the USAF on the JSOFI Leadership Task Force. Stacie is pursuing a Ph.D. in Leadership Studies from the Union Institute.

Major Scott Morgan is Deputy Director of Leadership and Command as well as an academic instructor at Air Command and Staff College, Maxwell AFB, AL. Scott is an Air Force Master Quality Instructor with training in advanced management tools from Xerox Corporation. Prior to ACSC, he served as a Quality Strategic Planner for the 89th Airlift Wing, Andrews AFB, MD. Scott is currently pursuing a Ph.D. in International Management from the Union Institute.

Using Technology To Enhance Organizational Analysis: A Case Study In Leadership Surveying

Ms Stacie L. L. Morgan
Balanced Management, Inc.
&
Maj Scott P. Morgan
USAF Air Command and Staff College

Abstract

In this paper we discuss how certain computer software can increase the speed and accuracy of organizational analysis. Specifically, we discuss how to use this technology to develop, distribute, and receive surveys, as well as to display and analyze collected data. We explain why we chose this software to aid our organizational analysis and how it is integrated into our method for obtaining 360 degree organizational feedback. We begin with an introduction to 360 degree feedback, which is a method for analyzing leader and manager effectiveness. We then discuss how we have adapted 360 degree feedback to our research on perceptions of Air Force Leadership effectiveness. This research will be the case study we use to showcase this survey technology. Our case study defines leaders as individuals with the rank of Lieutenant Colonel and higher. The sample population used in this study is Air Command and Staff College students. We use our own research in this case to show how data gathering was streamlined using a form creation software which not only creates and distributes surveys, but merges the collected information with statistical software so the computer can analyze and display the data. Our discussion assesses the advantages and limitations of using this technology which includes a detailed description of its application in our case study. Our personal experience with this software is used as a means to introduce this technology and highlight some organizational applications. Examples provided illustrate 360 degree feedback, survey field generation, and our quantitative Leadership survey.

Filling The Gap

Organizations are always being analyzed. The focus of organizational analysis may be on how resources are used, how well objectives are met, customer satisfaction, employee satisfaction, or performance. What ever the focus may be, there is always someone trying to find out if an organization's people and processes are achieving desired results. One methodology for assessing effectiveness is called 360 degree feedback. This approach looks at

individual or group performance from every angle in order to determine overall effectiveness. You may have already been exposed to this approach as a method for gathering feedback on a manager's performance. This 360 feedback is a compilation of information from performance appraisal questionnaires that have been distributed to the manager, her superior, her peers, and her employees. These appraisals assess the manager's perception of her own strengths and weaknesses, and then confirm her self-perception with information on how others see her performance.

We have taken 360 degree feedback to an organizational plane so we can fill an information gap that other assessments have not addressed. We will refer to a case study where the performance of Air Force leadership, as a group, is analyzed. In our research, leadership refers to formal, selected leaders with the rank of Lieutenant Colonel and higher. The concept of 360 degrees is used to illustrate perspectives that encompass a complete circle (see Figure 1). For our example, we wanted comprehensive data that looked at United States Air Force (USAF) leaders from an array of perspectives. Through our experience analyzing organizations and individuals we have found that the traditional approach of having leaders analyze their own performance and then having their superiors assess them is no longer an effective measure for true organizational effectiveness. Leaders impact too many areas that are often overlooked when studying their effectiveness.

Figure 1: 360 Feedback
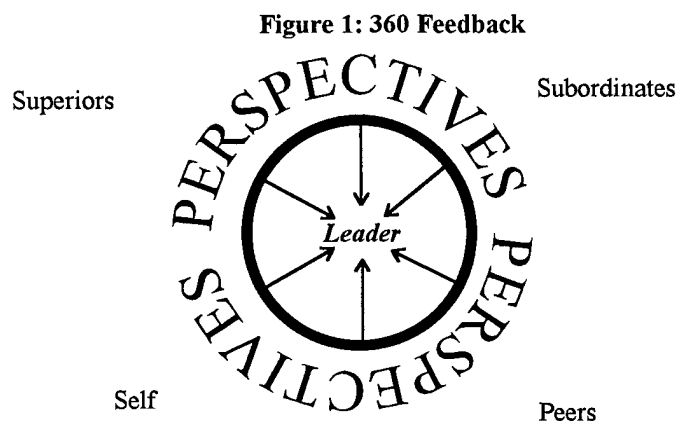
Figure 1: 360 Feedback

We chose to apply 360 degree feedback to USAF Leadership because we found the need for strong, clear, well respected leaders to be too great in our world. This seems especially true as we reconfigure into a global workplace where a focus on cooperating and developing all our nations replaces our former preoccupation with defense against aggression. We were also approached by senior leadership at Air Command and Staff College (ACSC) who sensed some officers' discontent and disconnection with current Air Force leadership and wanted to understand perceptions of existing USAF leadership and of the process for becoming an Air Force leader.

Our Methodology

Our primary hypothesis was that ACSC students believe that Air Force leaders do not consistently value or model what they say is important. Our secondary hypothesis was that ACSC students don't think the Air Force system has the ability to accurately identify the best people to be leaders (assigned to command positions). Our research assumption was that ACSC students are cynical about existing Air Force leaders. With these in mind, we used a nomothetic approach which involved studying a wide variety of persons in our investigation of USAF leadership effectiveness (Neale and Liebert 16). We selected this approach with the aim of identifying causal relationships that hold for USAF leaders in general.

We chose 360 degree feedback as a research approach because the Air Force leaders on our research team found they needed more information than they could obtain from directly questioning leaders. The goal of our research was to clarify Air Force leadership effectiveness. Our research team determined that the people USAF leaders impact and lead are important judges of current leadership effectiveness. Our use of 360 degree feedback was geared to cover a variety of perspectives on USAF leadership as shown in Figure 2, and to add subordinate feedback to the existing perspectives on existing AF leaders (shown in Figure 1). We agreed with Kerlinger's assessment of beliefs, opinions, attitudes, and feelings having equal, if not more, importance than strictly factual information (379). An example of Kerlinger's approach is our use of a statement such as, "I respect all USAF leaders" rather than, "USAF leadership is doing a good job." This subtlety gives us more information on how individuals feel about leaders and therefore perceive USAF leadership as a group.
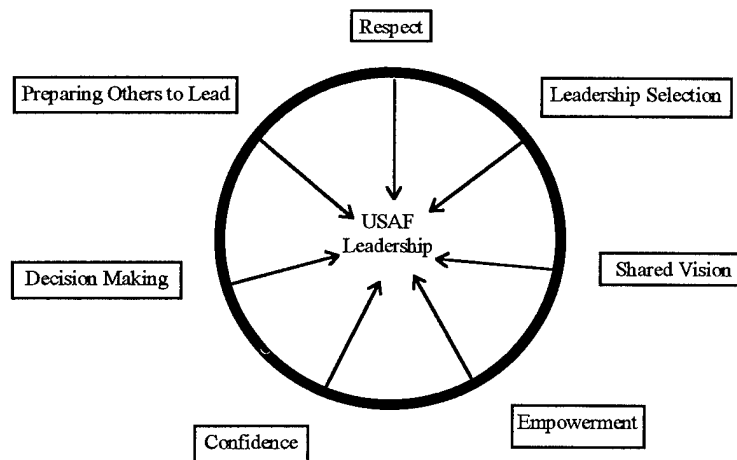

Figure 2: 360 Feedback Angles

We laid out an approach for 360 degree feedback looking at areas of leadership that included the promotion process, recognition, shared vision, respect, confidence, empowerment, and decision-making (see Figure 2). These areas were partially based upon Kouzes and Posner's Leadership Practices Inventory (LPI) dimensions: enabling others to act, challenging the process, encouraging the heart, inspiring a shared vision, and modeling the way (310). The LPI dimensions correspond to our areas of focus in the following manner: enabling others to act = recognition, challenging the process = decision making and confidence, encouraging the heart = empowerment, and inspiring a shared vision = shared vision. The last LPI dimension, modeling the way, was the major thrust of this study and is covered in the area of respect. Our focus on the promotion process was intended as barometer of the AF leadership program. We addressed these seven areas in the following four leadership survey dimensions:

1. Organizational direction
2. Selection of Air Force leaders
3. Preparing others to lead
4. Perception of current and past leaders.

In these leadership areas, *Organizational direction* covered shared vision, assessing how well leaders provide future direction, long-term guidance, and planning using a five point Likert scale determining the respondents agreement to these statements:

- Air Force leaders do a good job of providing future direction for our organization.
- Air Force leaders provide long term guidance by providing a shared vision
- Air force leaders are too busy with the day to day activities of the organization to worry about future planning.

Using the same scale, *Selection of Air Force leaders* addressed the promotion process and recognition by assessing respondents understanding of the how to get promoted and selection requirements:

- I know what is required of me to be promoted
- I know the process for selecting Air Force leaders
- To become an Air Force leader you need a sponsor
- Only the "good old boys" are selected as Air Force leaders
- I know what to do to become an Air Force leader
- I know what I need to do to be recognized for my accomplishments.

Preparing others to lead encompasses both empowerment and decision-making in statements designed to determine how well officers are given opportunities to practice leadership skills. The agreement scale is again used for these statements:

- Air force leaders do a good job of involving others in decision making
- Air Force leaders empower others to make decisions.

Finally, *Perception of current and past leaders* addresses respect and confidence, seeking level of agreement or disagreement with the following:

- I recognize a good leader when I see one
- There are very few good Air Force leaders
- I am always given credit by Air Force leaders for my accomplishments
- I am confident in Air Force leadership.

We wanted our methodology to eliminate bias in our data and insure the accuracy and validity of our findings. Duncan explains that "Neither conventional employee surveys, nor personal interviews, nor careful observations alone can tell managers all they need to know to understand and manage their organization's culture" (231). To overcome the problems that may be encountered with each type of assessment, we chose methodological triangulation (see Figure 3). Methodological triangulation relies upon a gestalt approach to analyzing the organization. It is accomplished through the use of two or more organizational analysis techniques. In our case we chose self-administered questionnaires, personal interviews, and direct observation. This approach provided us with quantitative as well as qualitative data. At this point, though, we had only fulfilled half of our survey equation: *what we want to know*. Our second challenge was *how we were going to get the information*. Since our population was 390 USAF ACSC students (international officers and students from other branches of service were not included in the population), we needed to survey a large sample, 193 students, in order to have a 95 percent probability sample. Since we only had a short period of time to do this, we turned to computer software technology for assistance.
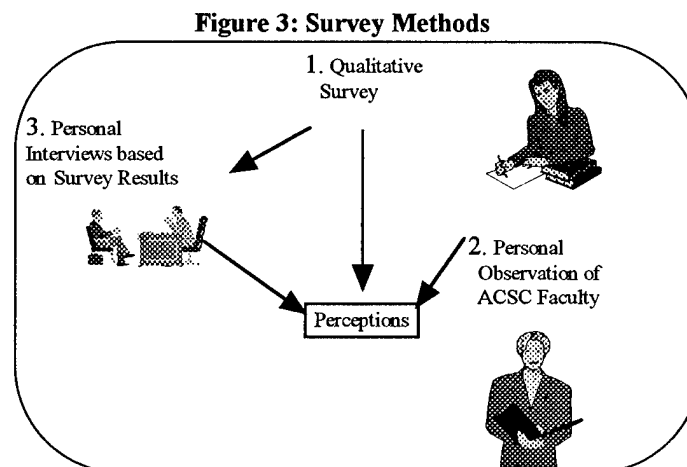
Figure 3: Survey Methods

Figure 3: Survey Methods

Using Technology

Our Air Force leadership research used a quantitative survey to gather the bulk of our data. We followed up on our findings with a qualitative survey which we used in personal interviews. As already stated, we had a short period of time to plan and complete the project. To meet our deadline we researched a variety of survey computer software programs to include Question, SurveyPro, Survey EZ23, Survey Analyst, and TELE*form*‰. Some of these products are integrated to include statistical software. After a discussion with a numerous technical representatives from a variety of companies, they recommended TELE*form*‰, a program developed by Cardiff Software, because of its ability to integrate surveys and forms with many types of database and statistical analysis packages such as Excel, Foxpro, Lotus, Oracle, Paradox, and Statistical Package for Social Sciences (SPSS) (Cardiff Software 2-6). We chose this program because of its sophistication and ability to interface with our current software programs, primarily Microsoft Office and SPSS.

Technology, such as TELE*form*‰, makes it easy to design and build forms. There are many different options for building the fields (areas in which respondents answer, see Figure 4) in programs such as this one. A primary option is the field ID, which is programmed into the forms reader and is used when the data on each survey is analyzed. Titles are established as variable names for your statistical program. When completed surveys are loaded into the statistical program, the software reads these variable names and automatically "dumps" the results into the predetermined columns with no requirement for inputting data manually.

Figure 4: Electronic Survey Fields

Figure 4: Electronic Survey Fields

Once the questionnaire form is built, it is necessary to determine how to send out the survey. TELE*form*‰ gave us the option of faxing our surveys directly from our computer to the respondent or printing a hard copy for reproduction and delivery. We were also able to receive completed surveys by faxing them directly to the computer software program, scanning them in, or keying the data into the system. A limitation of the software is that it does not allow you to individually code a survey for follow-up tracking during triangulation. In our case, we needed to know who the respondents were so we could follow up by administering the qualitative surveys to specific individuals. Our need to track each response

required us to print the surveys and manually place code numbers on each survey. This one manual task would have been required whether we created the survey by hand or by using computer software. Let's look at exactly how much this technology streamlined our data collection and analysis.

The quantitative survey we developed contained 21 questions. Our sample size was 193 USAF ACSC students. So our 21 questions times the 193 surveys sent out gave us a potential response of 4,053 data entries. Loading the responses manually would take approximately eight hours verses 4 hours using TELE*form*‰ software and a fax machine (calculations based upon actual data input comparisons and SPSS time savings tables, SPSS 3). It took four hours to manually input the data with a five percent error rate and another four hours to verify and correct the data. The TELE*form*‰ program loaded the surveys into the system in three hours and required only one hour to read and verify the data. The built-in reader and verifier looks for erroneous or missing entries, reducing the workload by alleviating the tedious step of reviewing each form for errors. Although these figures may seem small, time savings increases the longer your survey is. For example, we administered a 47 question survey to 200 people. This survey would have required approximately 18 hours and 30 minutes to manually input the data but it still only took us approximately four hours using TELE*form*‰ software. The processing time of our 47 question survey from 200 people was almost the same as the processing time of our 21 question survey from 193 people because the time it took to fax the surveys into the computer did not change significantly.

The power of this technology not only saved an extensive amount of time we would have spent entering our quantitative data, but it also can read the key words in our qualitative data! This technology shortens the length of time it takes to process your survey data and frees you to do other things while your surveys are being faxed into the computer. You can easily use the assistance of someone without any training on this technology to fax in your data for you. TELE*form* can be programmed to accumulate statistics on hand-written words that it reads on faxed or scanned in surveys using open-ended questions. Although the software does require about ten minutes per field of programming to recognize these key words, it cannot compare with the tedious task of analyzing a large survey population manually. It also decreases the chances for missing key words when data is analyzed manually.

Our process for the Air Force Leadership research was to design our survey in Microsoft Word for Windows and import our text into TELE*form*‰. We organized our questions in Word because we were just getting to know the forms software and wanted to experiment with this process. We found the spell checking a plus to using our word processing package for initial development. Once our questions were in TELE*form*‰ (a very easy import), we created our survey fields to be read by the system, marking our data for future use, mainly statistical analysis in SPSS. The TELE*form*‰ software comes with a fax program which allows you to fax your survey and then send a follow-up reminder to each recipient. Survey responses can be returned via fax as well as scanned in or entered on the screen, as previously mentioned. Each survey has four alignment marks which enables the computer to analyze the electronically returned survey. The user must give each returned survey form a

ACSC Leadership Survey
Draft   <Remote User>   *(Stacie and Scott Morgan, April 1996)*

MARKING DIRECTIONS: Use a No. 2 pencil or black pen and fill in oval completely.

USING THE FOLLOWING RATING SCALE, FILL IN THE CIRCLE WHICH CORRESPONDS TO THE NUMBER WHICH BEST DESCRIBES HOW STRONGLY YOU AGREE OR DISAGREE WITH EACH STATEMENT BELOW.

Strongly Disagree	*Disagree*	*Neutral*	*Agree*	*Strongly Agree*
1	**2**	**3**	**4**	**5**

1 2 3 4 5

1. I know what is required of me to be promoted... 1 ○ ○ ○ ○ ○

2. Senior Air Force leaders do a good job of providing future direction for our organizations.. 2 ○ ○ ○ ○ ○

3. I recognize a good senior leader when I see one.. 3 ○ ○ ○ ○ ○

4. I know what to do to become an Air Force commander... 4 ○ ○ ○ ○ ○

5. I know what I need to do to be recognized for my accomplishments............................. 5 ○ ○ ○ ○ ○

6. There are very few good senior Air Force leaders... 6 ○ ○ ○ ○ ○

7. I know the process for selecting Air Force commanders.. 7 ○ ○ ○ ○ ○

8. Senior Air Force leaders do a good job of involving others in decision making............. 8 ○ ○ ○ ○ ○

9. I am always given credit by senior Air Force leaders for my accomplishments............... 9 ○ ○ ○ ○ ○

10. Senior Air Force leaders provide long term guidance through a shared vision............... 10 ○ ○ ○ ○ ○

11. Senior Air Force leaders empower others to make decisions....................................... 11 ○ ○ ○ ○ ○

12. Senior Air Force leaders are too busy with the day to day activities of the organization to worry about future planning... 12 ○ ○ ○ ○ ○

Page 1 of 2

Figure 5: Leadership Survey (Stacie & Scott Morgan, 1996)
(Page 1 of 2)

MARKING DIRECTIONS: Use a No. 2 pencil or black pen and fill in oval completely.

USING THE FOLLOWING RATING SCALE, FILL IN THE CIRCLE WHICH CORRESPONDS TO THE
NUMBER WHICH BEST DESCRIBES HOW STRONGLY YOU AGREE OR DISAGREE WITH EACH
STATEMENT BELOW.

13. To become an Air Force commander you need a sponsor.. 13 ⊙ ⊙ ⊙ ⊙ ⊙

14. Only the "good old boys" are selected as Air Force commanders................................. 14 ⊙ ⊙ ⊙ ⊙ ⊙

15. I am confident in senior Air Force leadership.. 15 ⊙ ⊙ ⊙ ⊙ ⊙

16. Are you: **rated**   **nonrated**
                ⊙   ⊙

17. How many executive assistant jobs have you held?   0   1   2   3   4   5   6   7   8   9
                                                ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙

18. How many Colonels and / or General Officers have you directly worked for?
                                                    0   1   2   3   4   5   6   7   8   9
                                                    ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙ ⊙

19. Sex: Male   Female
            ⊙   ⊙

20. Have you ever been promoted below-the-zone?
                                         Does not apply   **Below-the-zone**
                                              ⊙   ⊙

21. My primary race is:
    1. Native American or Alaskan Native............... 1 ⊙
    2. Asian, Asian American or Pacific Islander... 2 ⊙
    3. Hispanic / Latino.. 3 ⊙
    4. African American / Black............................. 4 ⊙
    5. White.. 5 ⊙
    6. Other (specify) _____ 6 ⊙

THANK YOU FOR YOUR PARTICIPATION.

Researcher Purposes Only

Figure 5: Leadership Survey (Stacie & Scott Morgan, 1996)
(Page 2 of 2)

unique document number so you can tell the faxed or scanned in responses a part. Files can be saved as Excel, FoxPro, Lotus, Oracle, Paradox, SPSS, etc. (Cardiff Software 2-6).

As an example of a TELE*form*‰ document, please refer to our Leadership survey in Figure 5.

Conclusion

Although the results of our study will be published in a different forum, our use of technology to perform 360 degree feedback illustrates a different approach to analyzing your organization and reducing the cycle time of this process. Please keep in mind that we are not trying to sell the reader on TELE*form*‰ but are using it as a demonstration of what a computer surveying program can do for you and your organization. There are many programs that perform similar functions and vary in price. It is up to you to choose one which fits your budget and your needs. You may think of areas within your work group or larger organization that don't seem to be operating as they should or that people complain about. Perhaps you have even applied your problem solving process to a situation and did not achieve the lasting results or improvements necessary. The technology we have described and the concept of 360 degree feedback are tools at your disposal that can help you and your team gather and process valuable information in a timely and cost effective manner. Collecting and analyzing information can be overwhelming if you are not using technology to do as much of your work as possible. There is no better time than now to harness technology to help you analyze information you need for organizational improvement and innovation.

Works Cited

Cardiff Software. TELE*form* For Windows User Guide. Carlsbad: Cardiff Software, Inc., 1995.

Duncan, W.J. "Organizational Culture: 'Getting a Fix' on an Elusive Concept." Academy of Management EXECUTIVE vol. III, No. 3, 1989: 229-236.

Kerlinger, Fred N. Foundations of Behavioral Research. Orlando: Harcourt Brace College Publishers, 1986.

Kouzes, James M., and Barry Z. Posner. The Leadership Challenge. San Francisco: Jossey-Bass, Inc., 1987.

Neale, John M., and Robert M. Liebert. <u>Science and Behavior: An Introduction to Methods of Research</u>. 3rd ed. Englewood Cliffs: Prentice-Hall, 1986.

SPSS, Inc. <u>Statistical Package for Social Sciences Product Information Packet</u>. Chicago: SPSS, Inc., 1995.

Turning The Air Force Into A Learning Organization
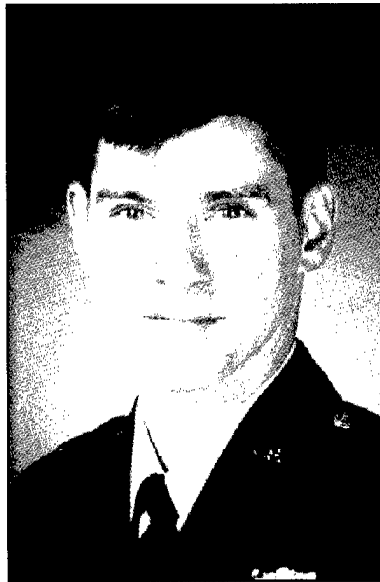
Capt Brad Davis

Capt Brad Davis is a Quality Advisor and lead strategic planning facilitator for the 92d Air Refueling Wing at Fairchild AFB, WA. He is a 1987 Air Force Academy graduate with a BS in History and earned his pilot wings at Laughlin AFB, TX, in 1988; he is currently a KC-135R instructor pilot.

Turning The Air Force Into A Learning Organization

Capt Brad Davis
92 ARW, Fairchild AFB, WA
(Acknowledgments to Lt Col Glenn Landram, Maj Jeff Hasler and TSgt Kevin Watton)

Abstract

This paper examines the dangers of being doctrinally inferior to our opponents and proposes that one of our main concerns should be to avoid this eventuality. The best way to do this is to create a learning organization. A learning organization makes maximum use of the intellectual and creative energy that our people bring to the service of their country. By systematically accessing this intellectual capital, we can build a picture of reality that will allow a much clearer basis for effective action than anything our adversaries are likely to possess. There are seven basic assumptions that learning organizations make and six components that we must incorporate to build one.

Paper Text

"I thought I had known what it was to be an officer, but I did not know it until then; for Eden [a soldier fatally wounded by a mortar fragment], who knew he was finished, but could not talk to me, gave me a look which told me that he completely depended upon me to take care of him. I patted him on the back, telling him I would look after him and he would be all right. He believed me."[1] These words were written by Lt Bruce E. Davis, an American air officer, serving as a liaison with the British 1st Airborne Division during that division's airborne invasion deep behind enemy lines in Holland during WWII. Almost immediately, things went wrong for the ill-fated division; German forces were much stronger than anticipated and the 1st Airborne was in danger of being destroyed only hours after hitting the ground. As it was, the British paratroopers managed to hold out against two German armored divisions for almost four days, nearly twice as long as expected in pre-attack plans. Operation Market-Garden, as the airborne/ground offensive was named, failed to achieve it's stated objective of seizing a bridgehead over the Rhine River, but it succeeds today in offering us a valuable object lesson.

In peacetime, it is profitable to periodically return to the accounts of such men as Lt Davis who witnessed first hand the costs of poor planning and poor organization. This knowledge may serve to re-energize our commitment as warfighters to the concept that our bottom line is not market share or stock price, but lives lost on the battlefield in the pursuit

---

[1] Office of Assistant Chief of Air Staff, Airborne Assault on Holland, Army Air Forces HQ, Washington, D.C.

of victory. There is little more to motivate us than that simple truth. To this end, we owe it to ourselves and to each other, to make every possible effort to find the absolutely <u>best</u> way to accomplish the mission. In this pursuit there can be no room for complacency. It is for this reason the U.S. Air Force must examine not just what we learn, but the very nature of how we learn as an organization and translate that learning into effective doctrine.

It is no mystery what kinds of benefits accrue to the fighting forces that hold a doctrinal advantage on the battlefield. History is littered with the remains of armies shattered by smaller, wiser foes. In many cases these surprising reversals came as a result of a new approach with old technology (e.g. Napoleon's victories, Crecy, Adrianople).[2] In some cases these defeats were caused by the advent of some new technology or mode of warfare (e.g. Pearl Harbor, German blitzkrieg, submarine warfare).[3] In more recent times, we saw the battle experienced, but doctrinally bankrupt, Iraqi army destroyed almost in place by a combination of air, naval, and ground power. At best, a nation attacked by a competent aggressor possessed of a superior doctrine can only hope that it has the capacity to slow down the attacker long enough to emulate or counter the new style of warfare. The Soviet Union paid the price of 20-25 million casualties in WWII before they were able to learn the Wehrmacht's method of mobile warfare and turn the tables. Similarly, U.S. and British shipping suffered huge losses to German U-boats before adequate countermeasures could be found. Had the Allies not possessed the capacity to absorb such losses, the outcome of the war may have been much different.

We must strive to remain doctrinally superior to any potential adversary. Doctrinal superiority has two essential sources, experience and intellect; both are important. Experience is usually the most reliable source of effective short term doctrine but it is expensive and perishable. Market-Garden, is an excellent example. That assault resulted in over 11,000 casualties among the airborne component and the British 1st Airborne Division was never reconstituted.[4] The lessons learned did allow, however, a much more successful airborne assault some six months later in Operation Varsity.[5] Still, the airborne doctrine we learned during the last year of WWII was nearly useless even 10 years later and would be suicidal against a determined enemy today.

Other factors also serve to make it difficult to rely on experience to guide. First, we cannot count on conflict to provide us with a meaningful picture of the military horizon. Conflict comes unbidden and often of a form alien to the contingencies that most concern

[2]Dupuy, Trevor N., <u>The Evolution of Weapons and Warfare</u>, Hero Books, Fairfax, WA. See pg 154-165 for a description of Napoleon's new approach, see pp 81-84 for the British use of the longbow against the French at Crecy, see pp 38-40 for the effect of heavy cavalry on Roman legions at Adrianople.

[3]Brodie, Bernard and Fawn, <u>From Crossbow to H-Bomb</u>, Indiana University Press, Bloomington, IN. See pg 206 for a description of the airplane's effect at Pearl Harbor, see Dupuy pg 237 for the role of the tank in blitzkrieg and pp 206-207 for a discussion of the effects of submarine warfare.

[4]Abbatiello, John J., "The First Allied Airborne Army in Operation Varsity: Applying the lessons of Arnhem" (M.A. thesis, King's College, London, 1995). pp 7-8, 15

[5]Abbatiello, see pp 30-33

us. Witness our problems in Vietnam, trying to apply conventional WWII operational strategies in a guerrilla war.[6] If we rely only on recent combat to provide our direction we never know when we might go to school, or what college we might attend. Second, our understanding of the experience of wartime fades with each passing year of peace. As old warriors retire and their expertise slips away, our military organizations run the risk of losing focus on wartime matters. Peacetime concerns can slowly infiltrate our doctrine and turn it away from true wartime priorities.[7] Third, "universal truths" discovered in one war run the risk of being suicidal doctrine in the next, as evidenced by the rows of French and British infantry marching into the face of German machine guns in WWI. If we insist on basing our doctrine on the last war, with only incremental improvements, we run the risk of developing an outmoded approach to war.

Intellectual sources are our best answer to these deficiencies. They are readily available in peace time and much cheaper, but they have also tended to be less reliable, hence the old adage, "No plan ever survives contact with the enemy." Since we cannot count solely on experience to provide us with the doctrine needed to fight the next war, we must improve our capability to advance our doctrine through our intellectual capacities. To do this, we must become a learning organization.

A learning organization is, quite simply, an organization that can learn. This is not the same thing as individuals in an organization learning, although that is part of it. It is a dedication to the component of integrity which is most simply labeled "truth." Organizational learning relies on the collective awareness and capability of the members that comprise it. A learning organization is not instant pudding. It will not arrive overnight, and it is not the product of a frenzied attempt to get everyone an advanced degree. Rather, it is a systematic approach that requires us to see our organization as a whole entity rather than segmented parts. We must recapture our identity as integral components of the Air Force body. We must truly believe that we are a force for good and act in accordance with that view. This means that our world view must be flexible enough to admit alternate viewpoints.

The model of a learning organization presented here is an amalgam of several sources. Peter Senge's The Fifth Discipline, Scott Peck's The Road Less Traveled, Robert Ornstein's The Roots of the Self, Carl Sagan's and Anne Druyan's Shadows of Forgotten Ancestors, John Keegan's The History of Warfare, and many other works of a cross-disciplinary nature have combined to suggest this basic model to me.

The first of seven basic assumptions about a learning organization is that **no one person has a complete understanding of reality**. Some have a more accurate view than others but everyone's view is incorrect in some way. The other six assumptions are:

---

[6]Jim Dunnigan and Albert Nofi, Shooting Blanks, William Morrow Co, New York, 1991, pp 64-65
[7]Dunnigan and Nofi, pg 84

2. The more time people spend thinking about the organization, the better.
3. The more people in the organization know, the better.
4. Each person understands something about the organization and its current state that nobody else does.
5. Only people can solve people problems.
6. We can never understand the whole picture, we can only approximate it.
7. The essential role of any human organization is to bring people together to solve human problems.

These are contentious issues with some people and the learning organization is unlikely to arise if these approximate truths cannot be accepted to any significant degree. If agreement with the basic philosophy can be assumed, however, we can identify six basic components or ingredients to building a learning organization.

1. We must attempt to maximize the number of people available to think about the organization.
2. We must attempt to maximize the amount of time each person is able and willing to spend thinking about the organization.
3. We must attempt to maximize the amount of useful information possessed by each individual.
4. We must attempt to maximize our ability to gain access to every person's viewpoint.
5. We must effectively incorporate the views accessed into an organizational view of reality.
6. We must systematically adapt the organization to respond in the most effective way to gaps between perceived reality and shared vision.

Based on these requirements, the action plans can nearly write themselves. How do we maximize the number of people available and the amount of time they spend thinking about the organization? While manning is largely a matter of Congressional mandate, we have leeway in influencing how much time our people spend thinking about the Air Force in general and their own units in particular. There are several programs already in place to insure this happens, chief among them are pre-commissioning military education and professional military education. While these programs are exceptional attempts to encourage our people to learn about our organization and purpose, this same focus and determination does not find its way into most work centers around the Air Force. Programs like the Suggestion Program attempt to induce members to think about their organization through promises of monetary rewards and there are many less formal means as well. The only reliable means of increasing the amount of time people are willing to spend thinking about their organization is to increase people's commitment to that organization's success.

How do we maximize the amount of useful information possessed by each individual? Training is the first, most obvious, answer. The Air Force is exceptional in this regard with nearly every enlisted Air Force Specialty Code serviced by some kind of technical training school. Academic learning through advanced degrees is another strength. Crosstell, benchmarking and extensive reporting also aid Air Force members in gaining access to useful information. Our weakness lies largely in our functional culture which is heavily

influenced by a "need to know" attitude, even when the information is not classified. Supervisors routinely filter information from higher headquarters before passing it to their subordinates and members are rarely rewarded for asking "tough" questions of their superiors. Much of the truly useful information our people need or could effectively use is not available to them, or if it is available, they are neither encouraged nor enabled to spend the time and resources to get it. We need to develop systems that make it easy for Air Force members to research their ideas even outside their own functional area.

When an Air Force member manages to get useful information and succeeds in forming a useful viewpoint that would aid in problem solving attempts, it is questionable whether that person will have a forum for channeling that viewpoint into the proper decision making circles. If we are to benefit from the effort to give people good information and their efforts to think about it, we must build a reliable method of harvesting their opinions. The "open door policy" and "suggestion box" are rarely sufficient for this task. Surveys are good starts but we can't stop there. Inviting initiative or obtaining feedback in innovative ways when time and resources permit needs to become the only acceptable mode of conduct if we are to come close to building a learning organization.

Once feedback is obtained, we need to have powerful methods for turning the data into a working model. Various computer simulations already exist that help us build models and understand everything from personnel manning and operational strategies to aircraft characteristics and Cockpit Resource Management. However, we also need to increase our capability to incorporate our member's views into the organizational perspective. That is, we must be able to generate an honest assessment of our unit's capabilities, propensities and values. The more intellectual capital we can spend in this effort, the more accurate the assessment will be. More credence needs to be given to the "Do" (test) portion of the Shewart Cycle (Plan, Do, Study, Act). The models we build and the tests we run must then be subject to relentless scrutiny and then tested and modeled some more. Even after a program or doctrine is on-line, it must be continually assessed and tested.

Increasing the accuracy of an organization's view of itself is tremendously difficult and all large organizations struggle with this task.[8] Structural and cultural barriers to divulging the truth or voicing dissenting opinion can shut down any attempt to create a learning organization. Assuming the organization can overcome these significant barriers and develop a relatively accurate view of its capabilities and direction, it needs to have the capacity to act quickly to close the gaps identified. This action is completely dependent on the unit's capability to generate some sort of shared vision of what needs to be done. While combat can be a remarkable magnifying glass for this effort, actual combat is too uncommon to rely upon routinely for this purpose and by that time it may well be too late. With the knowledge that combat is always the end game towards which military forces are poised, shared vision should presumably be easier to achieve in the military than in civilian companies and other

---

[8]Senge, Peter, The Fifth Discipline Fieldbook, New York, 1994, pp 213-214

organizations. A true learning organization will always strive to build a vision that its members commit to, not simply comply with. The result of a successful effort is an organization that can redirect and adapt with amazing rapidity.

Joint Pub 1 from the Chairman, Joint Chiefs of Staff says,

> "Being alert to seizing or creating such opportunities [for asymmetric engagements] is the business of the joint force as a whole, including not only joint force commanders and their staffs but their component commanders and staffs. "Cross-talk" and cross-fertilization of ideas often produce cheaper, better and faster solutions to combat problems."[9]

This is the forte of the learning organization. Cross talk and cross fertilization will only be as effective as our learning capabilities let them. We can have talented people with excellent ideas and insight, but if our organization isn't prepared to honestly deal with the issues raised then we haven't doen the best possible job of developing our doctrine or operating strategies. History provides numerous examples of the dangers of bankrupt doctrine. Trevor Dupuy wrote, "Until the present time, the application of sound, imaginative thinking to the problems of warfare (on either an individual or institutional basis) has been more significant than any new weapon; such thinking is necessary to real assimilation of weaponry; it can also alter the course of human affairs without new weapons."[10]

The seven assumptions and six components of a learning organization presented here lay the groundwork for future discussion. Undoubtedly we can improve them and I feel it is essential that we do so. If we are to well and faithfully discharge our duties, then we must examine every aspect of how we prepare for and conduct war. Our doctrine must be sufficient to our tasks.

Our best shot at staying well ahead in this arena is to include the very people we praise so highly, the dedicated men and women of the U.S. Air Force. By fully mobilizing everyone's capability for rational thought and creative thinking, we will be and always remain, the world's most respected air and space force.

---

[9]The Chairman, Joint Chiefs of Staff, Joint Pub 1, <u>Joint Warfare of the U.S. Armed Forces</u>, National Defense University Press, 1991, ph 61.

[10]Dupuy, pg 340.

The Integrated Annual Planning (IAP) Model

Capt Bryan K. McGraw

Capt Bryan K. McGraw is the 131st Services Flight Commander for the 131st Fighter Wing (ANG), located at Lambert Field, St. Louis, Missouri.

Capt McGraw is a distinguished graduate of the Air Force ROTC program, has a B.S. in Geography from Southeast Missouri State University, and a Master of Public Administration from the University of Oklahoma. He served on active duty for nearly eight years before transferring to the Reserve in 1992.

He is currently completing a Ph.D. in Public Policy Analysis at St. Louis University.

The Integrated Annual Planning (IAP) Model

Capt Bryan K. McGraw
General Mitchell International Airport-Air Reserve Station, Wisconsin

Abstract

Annual and strategic planning is a process of tremendous importance to many organizations. While strategic planning looks at long term goals and requirements, the Annual Plan addresses short term, annual requirements to support the Strategic Plan. Preparation of a realistic, meaningful Annual Plan is a requirement in the Air Force Reserve. The Annual Plan supports the Air Force Reserve (AFRES) Long Range Plan (5-year plan) and the AFRES Strategic Plan (5-15 year plan). However, efficient and effective annual planning is something all organizations should consider doing, not just AFRES units, especially in this age of mission changes, downsizing and force reductions. The reasons are obvious, annual planning gives an organization a say in their direction, and provides senior leaders and higher headquarters with meaningful feedback as to their planning effectiveness. The Annual Plan should encompass not only higher headquarters planning guidance, but also local requirements and the goals and objectives of the Quality Air Force Criteria. This is not an easy process. This paper outlines a planning model or process which may help organizations meet the changes facing them, and offers an innovative approach to integrating these essential, yet often confusing requirements. This, the Integrated AnnualPlanning (IAP) Model as it is called, is an attempt to develop a simplified process by which organizations can systematically create a meaningful Annual Plan fully integrating innovative processes, goals and objectives with Air Force mission requirements.

Introduction

Planning is absolutely essential to organizational survivability. Organizations that plan effectively and can execute those plans in an efficient manner, have an increased probability for ensuring their success and survival. You should notice that I said "increased probability for...", not "definitely" or "guaranteed." There are few guarantees in life. Unfortunately the best laid plans can fail miserably, especially when the plans developed are antiquated, too rigid or nearsighted. History has taught us valuable lessons about planning. We should learn from history as we attempt to tackle or spearhead the next paradigm shift. For example, had German and French planners been receptive to history, change and innovation, the Shlieffen Plan of World War I, and France's Maginot Line of World War II would probably not have been created (or would have been much different than what was actually

developed), especially if the planners had integrated innovative concepts instead of anti-quated military strategies. Another way to look at the value of innovative planning is to consider the following quote, *"Past success is no measure of continued existence."* Thus, annual planning is not something to be taken lightly or to accomplish in a disorganized, cavalier manner. Annual planning must integrate near-term objectives, goals and require-ments to long-term and strategic plans.

How then do we develop an innovative Annual Plan and integrate it to mission require-ments, Quality Air Force, and the like? Giving answer is easy; implementing it is difficult. The answer is this: Senior leaders in the organization must drive the leadership process to accomplish effective, meaningful planning. This leadership must empower commanders, supervisors and managers in all levels of the organization to become actively involved in the planning process, not just a few key individuals on the wing commander's staff. Further-more, realistic milestones for planning objectives need to be developed— by the process owner— along with meaningful metrics to accurately measure the plan execution and overall success. Sound familiar? It should, especially if you've been involved in Quality Air Force, Total Quality Management or the Baldrige Criteria. Creating a meaningful Annual Plan which follows all the proper steps is something which has eluded most organizations. In the past, many Annual Plans were incomplete, lacking a comprehensive design, or failing to include a process owner or metrics to validate what was being said. These plans were often created to satisfy a higher headquarters suspense, then conveniently placed in a binder or file cabinet until it was time to do next year's plan. This was not annual planning; instead, it was a waste of time.

The Planning Process

Before outlining our planning model, we need to review the AFRES planning process, illustrated in Figure 1. Figure 1 illustrates the three-tiered concept used in AFRES to plan. At the top of this process is the AFRES Strategic Plan which addresses long term require-ments, goals and expectations of the command (5-15 years out), and is prepared by the Chief of the Air Force Reserve. This plan outlines the vision and mission of AFRES, roles and agenda of the command, along with AFRES guiding principles.

The Long Range Plan (5-year plan) looks at the current year, plus four future years. As you would expect, the Long Range Plan outlines more specific steps, objectives and targets the command should follow to fully implement the Strategic Plan. The targets are divided into five principle areas (from the Strategic Plan): Leadership, Readiness, People, Planning and Force Structure Goals. The Long Range Plan is prepared by headquarters AFRES.

110

```
┌─────────────────────────────────────────────────────┐
│                                                       │
│        AFRES STRATEGIC PLAN (5-15 YRS)                │
│                 ▲  - Vision   │                       │
│                 ┊  - Mission  │                       │
│                 ┊             ▼                       │
│        AFRES LONG RANGE PLAN (5 YRS)                  │
│                 ▲  - Targets  │                       │
│                 ┊  -Goals     │                       │
│                 ┊             ▼                       │
│        WING ANNUAL PLAN (Current Year)                │
│                    - Locators                         │
│                    - Metrics                          │
│                                                       │
└─────────────────────────────────────────────────────┘
```
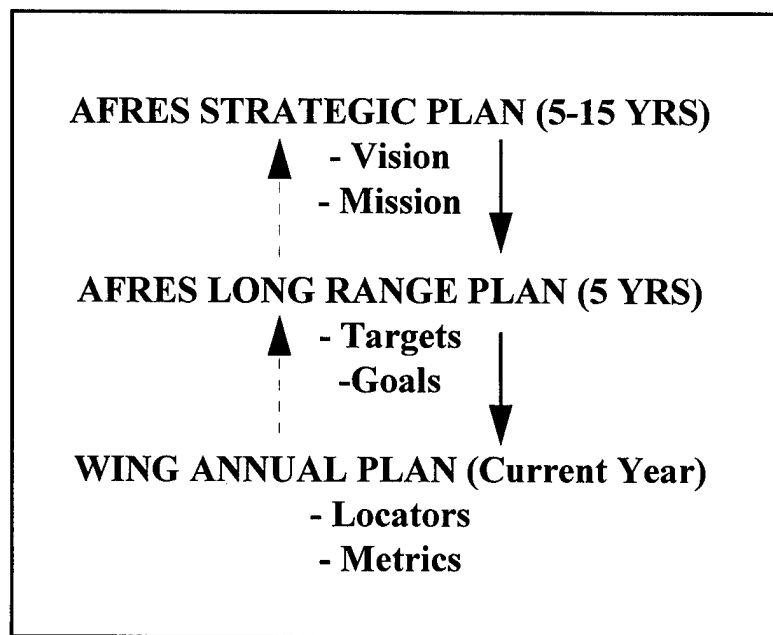
Figure 1. The AFRES Planning Process

The Annual Plan, is a wing-level document which spells out how the organization will meet the goals, objectives and targets outlined in the Long Range and Strategic Plans. The Annual Plan includes specific goal target identifiers called "Locators," which tie into specific command goals. The Annual Plan should also assign a process owner for the respective target locators, along with supporting metrics to validate goal accomplishments.

An interesting feature of this process is that it's both a top-down and a bottom-up process. This allows units to provide direct feedback to the command and Chief of the Air Force Reserve on the planning process, setting goals, identifying trends in metrics, and direct input into the strategic agenda.

Another way to view this systematic process is outlined in Figure 2. In the Systems View of AFRES Planning, we see a step-by-step process of planning from the development of the Air Force Vision and Mission statements, through the wing-level mission accomplishment and validation of metrics and trends.

Effective Air Force planning must incorporate many factors. This is especially true in the Air Force Reserve, where the majority of the personnel serve on a part-time basis. Such things as changing Air Force mission requirements, changing world threats, national priorities, employers, families, other branches of the military, the American people and ultimately the reservists themselves are among the planning factors that call for consideration.
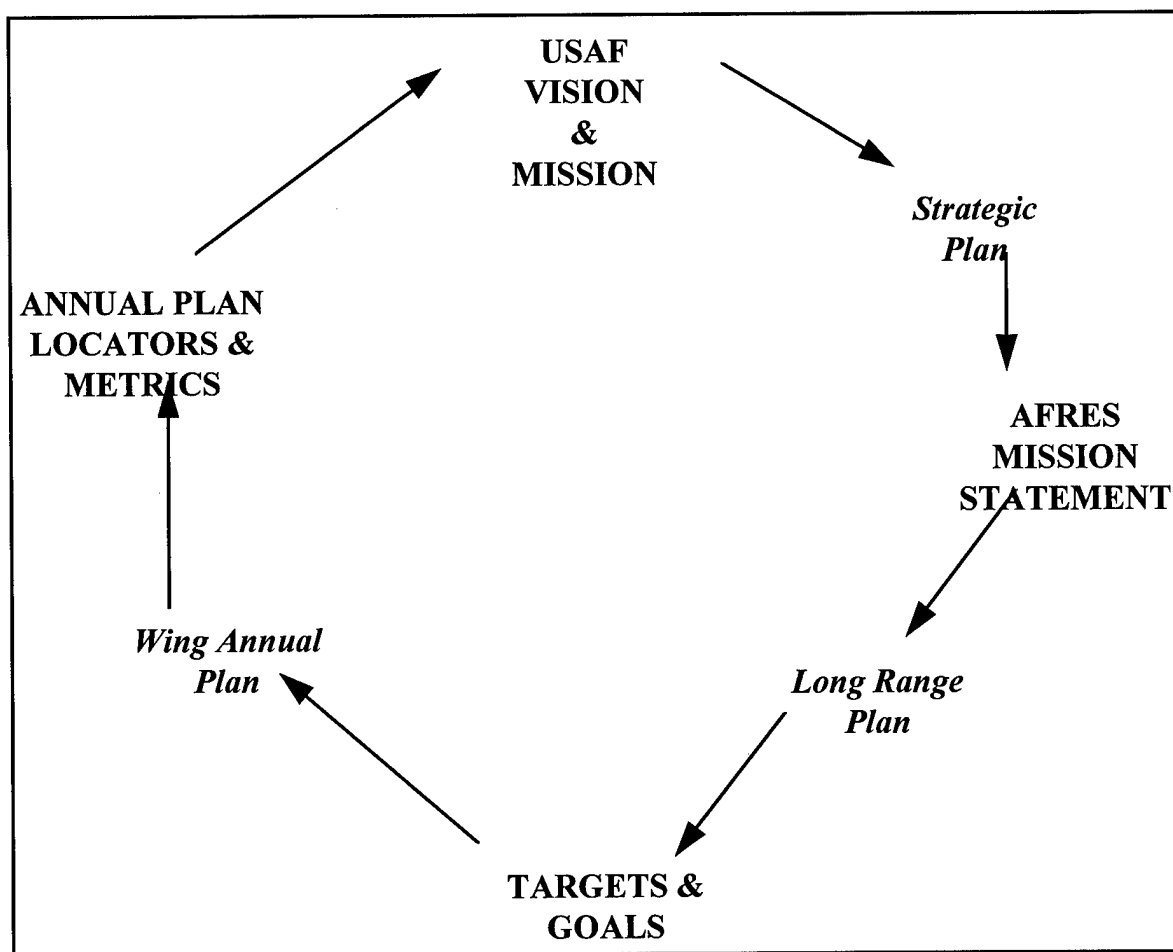
Figure 2. A Systems View of Air Force Reserve Planning

These factors, along with the goals of Quality Air Force (continuous improvement, customer satisfaction, innovative & empowered leadership, etc.), should be included in each wing Annual Plan. Examining the Quality Air Force Criteria, we see the seven categories playing a direct role in not only annual planning, but in everything an organization is trying to do. Once again, a picture is worth a thousand words. Figure 3, The Systems View of the Air Force Reserve, shows the relationships between wing goals and objectives, the Quality Air Force Criteria, and internal and external factors that must be addressed in annual planning and day-to-day operations. Thus, the Quality Air Force Criteria becomes a filter mechanism through which internal and external factors and unit goals and objectives must pass in order to achieve improved customer satisfaction, innovative mission accomplishment and continuous improvement.
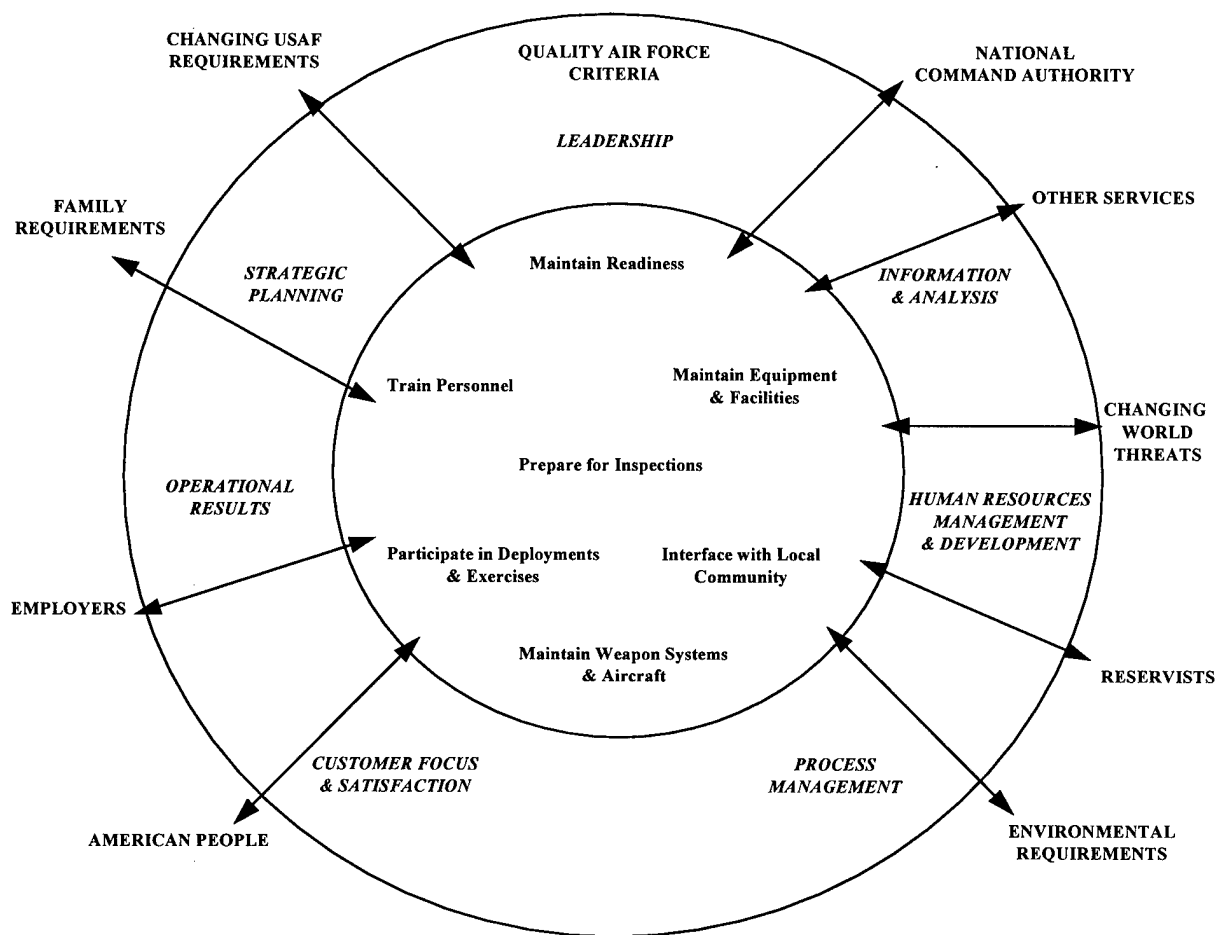
Figure 3. Systems View of the Air Force Reserve

Integrated Annual Planning (IAP) Model

The IAP Model is a tool organizations can use to integrate the myriad of objectives, goals and requirements into an comprehensive, effective Annual Plan. The IAP Model takes the requirements outlined in the Long Range and Strategic Plans and links them to the Quality Air Force Criteria. Figure 4 shows the IAP Model. As you can see, several components go into the creation of an integrated Annual Plan.

The Strategic & Long Range Plan requirements come from higher headquarters. The Annual Planning Worksheet (Figure 5), is used to outline the specific steps to implementation, identification of the process owner for a specific goal/target, identification of a metric to validate goal completion and to identification of which unit key process it supports.
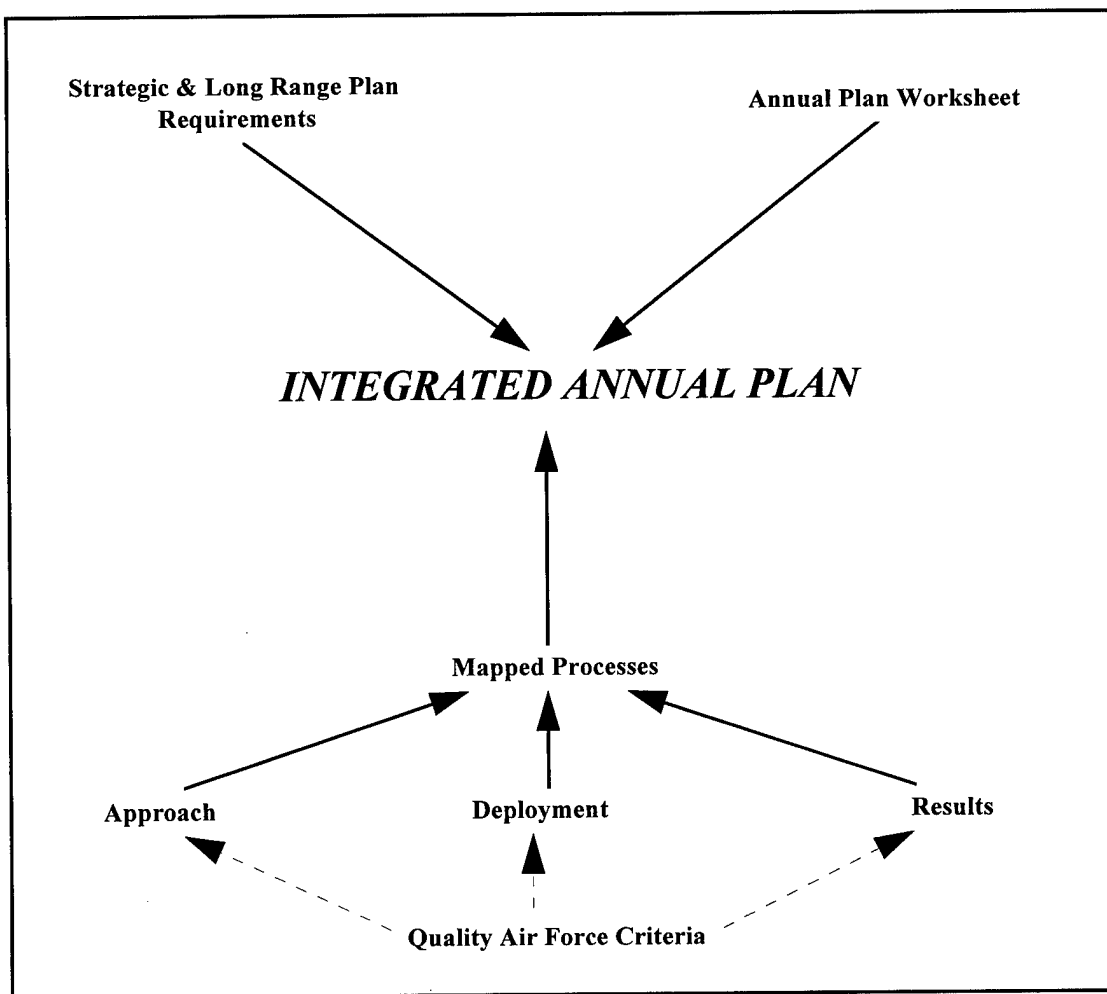
Figure 4. The Integrated Annual Planning Model

Upon completion of the Annual Planning Worksheet, the unit reviews their key processes (which should have already been identified). The processes are mapped to show the specific steps within them. This is a common practice and nearly every organization has mapped or flow- charted their key processes. However, it is in the mapping of processes that the true linking of the Annual Plan and the Quality Air Force Criteria takes place.

Instead of following the standard flow-charting methodology, an innovative approach can be used to not only map processes, but show the direct relationship of the Annual Plan to command goals and the Quality Air Force Criteria. Using non-standard symbols, you can integrate the three phases of the Quality Air Force Criteria (approach, deployment and results) with the Annual Plan. Figure 6 shows an example of this in the mapping of a fictitious Readiness process. You will notice some of the actions in this process fall under the Approach Phase, which includes the steps in the process dealing with the planning, approach or methodology used in preparing for Readiness. The Deployment Phase is the

Annual Planning Worksheet

AFRES Long Range-Plan Locator: _____   Year: _____

OBJECTIVE (From Long-Range Plan): _____
_____
_____

UNIT STEPS TO IMPLEMENTATION/GOAL: _____
_____
_____
_____

METRIC (indicate type, frequency of measurement, objective): _____
_____
_____
_____

LINKED TO WHICH KEY PROCESS? _____

PROCESS OWNER: _____

Figure 5. The Annual Planning Worksheet

implementation of Readiness and shows the steps involved in executing Readiness. The Results Phase is the measurement or metrics portion of the process and includes the steps involved in measuring the success or extent of full implementation of Readiness. Each step is identified by the specific shape of the phase in which it occurs. For example, the Approach steps are identified by blue circles, corresponding to the organization or "bringing together" specific planning steps. The Deployment steps are identified by yellow triangles, which represent the "action" steps, and the Results steps are identified as red hexagons to show the end product measurements used to validate the process.

Looking further at this mapped process, you see each step has additional information identified in the circle, triangle or hexagon. Figure 7 highlights "Evaluate ORE," (ORE is Operational Readiness Exercise) from the Results Phase step (as identified by the hexagon and red color). Additionally, the top of the hexagon shows the process owner, or the office responsible for this step in the Readiness process. The bottom of the hexagon shows the specific Annual Plan locator this step supports. In this case it is Readiness goal one, Target two (R1T2), which comes from the AFRES Long Range Plan.
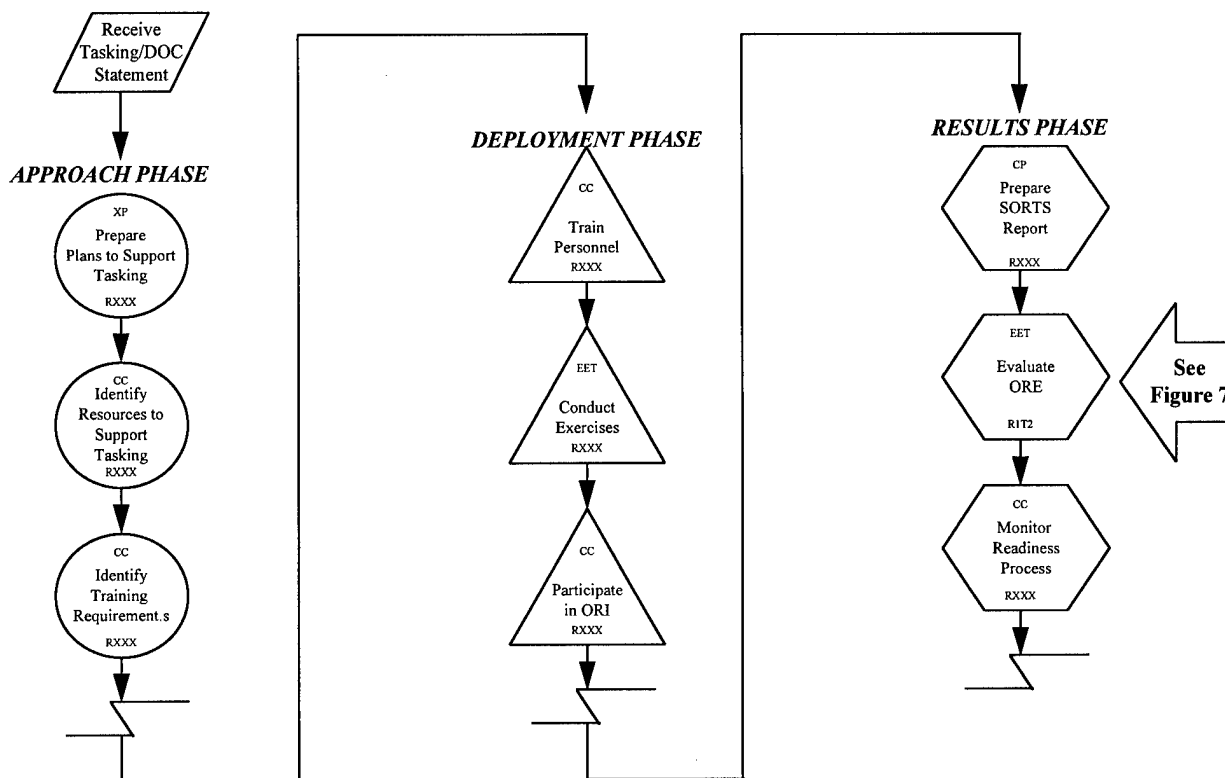
Figure 6. Portion of a Readiness Process

Thus, by using the Integrated Annual Planning Model, one can systematically link Annual Planning actions with not only the command Strategic and Long Range Plans, but also with the Quality Air Force Criteria, using through an integrated mapping of the process.

Conclusion

The Integrated Annual Planning Model is yet another tool or methodology organizations can use to better integrate planning efforts and real world actions. Hopefully, through innovative use of this model and creative thinking among planners, organizations can develop realistic, comprehensive plans that directly link to strategic objectives and day-to-day operations. This model is merely a starting point and should trigger other innovative ways and approaches to planning and total quality implementation. If organizations can follow the IAP Model or a similar process, ineffective planning will become a thing of the past. We must make quality a permanent component of our organizational culture. We must make quality planning an effective process free of wasteful, non-linking steps, especially as the Air Force faces new and ever-increasing threats to our existence and way of life. The quote, "*Past Success is No Measure of Continued Existence,*" has a tremendous amount of validity and is certainly applicable to Air Force planning and mission execution.

Process Owner ──────────────▶ EET

Evaluate
ORE

Specific Step (Results Phase)
in Process ──────────────▶

R1T2

Specific AFRES Locater This Supports
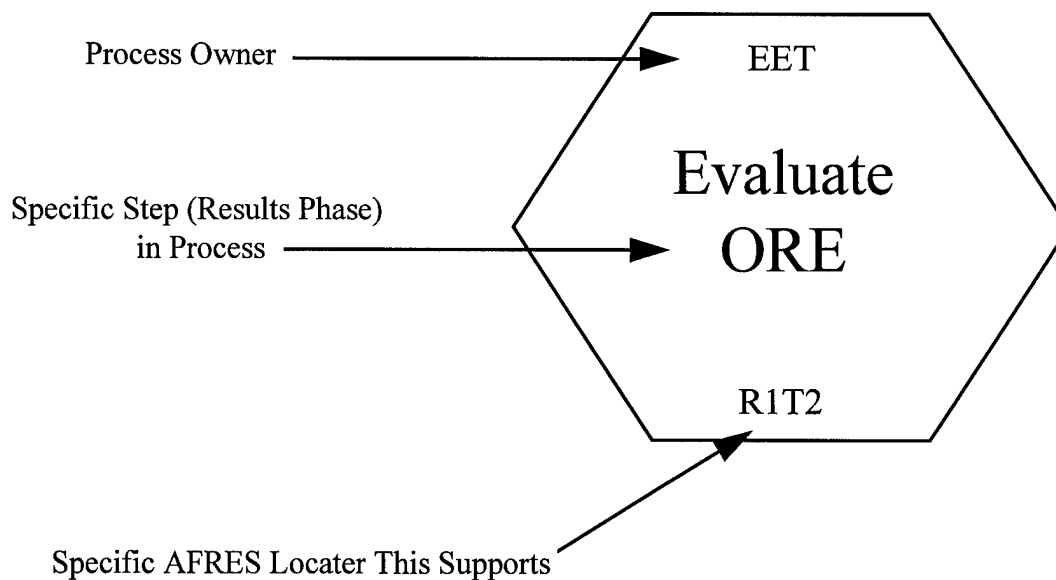
Figure 7. Sample Step in Readiness Process

Bibliography

Air Force Instruction 90-501, <u>Criteria For Air Force Assessments</u>. HQ USAF/PEQ. 1995.

Headquarters The Chief of Air Force Reserve, <u>The Air Force Reserve Strategic Agenda</u>. HQ USAF/RE. 1995.

Headquarters Air Force Reserve, <u>United States Air Force Reserve Long Range Plan, 1996-2000</u>. HQ AFRES/CV. 1995.

United States Air Force Reserve. <u>Continuous Improvement Master Plan</u>. HQ AFRES/QIX. 1995.

Headquarters 440th Airlift Wing, *1996 Annual Plan*. 440 AW/CC. 1995.

National Institute of Standards & Technology, *Malcolm Baldrige National Quality Award, 1995 Award Criteria*. Undated.

147th Communications Flight
Workload Control System

Capt Don C. Rabalais

Captain Don C. Rabalais is currently the Commander of the 147th Communications Flight at Ellington Field, Houston, Texas. He began his Air Force Career in 1980 at Randolph AFB, Texas and has served with the regular Air Force, The Air Force Reserve and is now on an active duty tour with the Texas Air National Guard. He teaches management and business courses part time at a community college near Houston, does some off-duty consulting work with local businesses, and has a personal interest in the field of organizational behavior. The 147th CF Workload Control System was developed by Capt Rabalais and TSgt Mark Davison.

147th Communications Flight Workload Control System

Capt Don Rabalais
147th Communications Flight

Supervising the work of subordinates is one of the most time consuming tasks we face each day as managers. Supervision includes commanding, controlling, coordinating, planning and organizing, and all of these disciplines are covered in this system. The 147th Communications Flight Workload Control System (WCS) allows supervisors to establish work to be done, specify acceptable performance standards, monitor and comment on the progress of work performed, and to hold employees accountable for assignments in one simple system. Because this system is used on a local area network all of these supervisory tasks can be accomplished without interrupting the flow of everyday work schedules. Managers can check the progress of work "over the shoulder" of employees by accessing this tracking system from their desktop computer.

This workload control system can be customized to fit into any organization that performs work initiated from internal and external customers, supervisors, and duties inherent to the employee's position. This includes just about every work section in almost every organization to some extent. The nature of work is the same in any career field.

There are work assignments generated by internal and external customers that need to be documented and monitored. This is done by a help desk technician opening a work order and assigning it to a specific employee with the customers "problem" explained in detail. The electronic work order is referenced on the network under the assigned technician's name and is available on the network immediately after the document is created and saved. An interface with e-mail notifies the assigned employee that there is a work order waiting to be serviced and also notifies the customer that the request for work is being handled by a technician. Now instead of printing and routing a work order manually, the customer request for help is available immediately to be worked. We estimate that manual work orders took on average 2 days to reach the assigned employee, now take less than 10 minutes

Work that is created by circumstances within an organization are classified as projects. These are generally longer term in nature than work orders and are initiated by supervisors. A separate part of the 147th CF WCS is designed for Special Projects tracking. A supervisor opens a project worksheet and clearly states the objective of the desire end result. An employee is assigned to the project and is involved in brainstorming a list of tasks required to complete the project. Once again the project worksheet is kept current electronically by the employee and the supervisor can observe work progress on the network without interfering with normal operations. If the employee gets off task then the supervisor can intervene and redirect the employee. Using this system supervisors are kept abreast to what subordinates are doing and can coach them to improve their overall performance.

All employees have work that is inherent to their position. These items are called To-Dos. These are normally things that employees keep track of each day as they perform their work. The To-Do tasks are not associated with work orders or special projects. These To-Do items are kept in a separate section within the 147CF WCS. To-Do items are created and updated by individual employees but are visible by management on the network. Access to each section within the WCS is controlled by system administrators.

Possibly the most valuable networkable section within the WCS is the Continuity Book feature. This is a text-based database using Lotus Notes that documents every procedure and policy in the organization, much like a technical reference library. Documents created in any word processor can be imported into this area and are visible as "read only" by anyone with access rights. This provides a ready source of information on every procedure and technical reference in the organization. Every entry is cataloged within a reference section and then is filed alphabetically. Find the topic you want and click to view the complete document.

Working together this Workload Control System is a powerful tool for managers to command, control, coordinate, plan, and organize their organizations and employees. There are many different commercial off the shelf software packages that could be integrated to do similar tasks, however we find that the Lotus Notes package allows the use of many different inputting devices and is easy to learn and expand.

Objective: To provide an electronic platform to manage work flow from inside and outside an organization. Work orders, special projects, section To-Do items, continuity documentation and other related data can be stored electronically and shared across the local area network. This reduces time to get assignments to technicians and allows for a paperless operation. Additionally, it makes electronic statistical information available by "point and click".

Technical Specifications: Lotus Notes server software running on an OS/2 operating system on a Pentium 90mhz Banyan VINES network. Trellis Corporate Help desk software provides the database and work order functions for customer contacts and work assignments. Lotus Notes provides additional database functions that allow internal assignments and continuity documentation to be integrated into the system. Software needed to complete the system: OS/2, Lotus Notes, and Trellis Corporate Help Desk.

Implementation: All Communications customers contact one number (help desk) for assistance. The Help Desk technician opens an electronic work order and interviews the customer over the phone. After all pertinent data is captured the work order is assigned to a maintenance technician and is available on the network for immediate action. The e-mail function of the software notifies the assigned technician that work needs to be done. It also notifies the customer that the work order has been assigned and to whom and when the work will be completed. The database tracks suspense dates and a host of other data for work trend analysis. When the work order is complete the system randomly selects 20% of the closed work orders to be quality checked by senior management. The quality assurance

feature is customizable as is much of the help desk software. For internal work- special projects or section To-Do items can be entered into the database and tracked by management on the network. As well sections can store continuity information on the Notes database for future update and retrieval by any network user with access.

Applicability: This system has been looked at by several other agencies for possible implementation. It would serve the needs of any organization with a workload control function.

Statistical Process Control:
The Link To Quality In Daily Operations

Capt Ken Theriot

Capt Theriot spent two and one half years as the wing quality advisor at RAF Alconbury, UK from 1992 to 1994. He's been at Luke AFB for 2 years and is currently the OIC of the 56th Logistics Group Quality Support Office. He has been a quality advisor throughout. He presented papers at two of the previous three QAF Symposiums. His quality education ranges from military courses to George Washington University, The lAmerican Society For Quality Control, and consultation with many and varied quality practitioners. He has instructed about 300 people so far at Luke AFB in a 6-hour SPC class he authored.

Statistical Process Control:
The Link To Quality In Daily Operations

Capt Ken Theriot
56th Logistics Group, Luke AFB, AZ

Abstract

Capt Theriot suggests that one main reason for the difficulty of imbedding quality concepts into daily operations is the lack of statistical thinking in the crucial area of performance results analysis. Leaders would have an easier time seeing the value of QAF if they could see tangible evidence of quality problems or successes in the charts they look at every day. Statistical Process Control (SPC) offers a tool, the x/mR control chart, which can lead to daily references to the all-too-often-ignored , but crucially important effects of variation on our mission-critical systems results. After explaining some basic principles of the control chart and their benefits, Capt Theriot shows an example from an AF supply squadron of how much additional important information could be gained from a control chart, versus the bar chart of the same data.

We seem to have forgotten about the importance of statistical thinking. Dr. Deming, though more famous for his fourteen points, always kept statistical methods in the forefront of his teachings. When Dr. Deming died, his business card did not herald "Quality Consultant," but rather, "Consulting Statistician," as it always had.[1] The Air Force has somehow lost touch with that concept. The theory of statistical process control offers us a tool, in the form of the control chart, which offers more in the way of potential substantive quality improvement than years of "teams or awareness training." We can use SPC to show commanders exactly how quality management applies directly to them daily.

Much frustration has resulted from trying to implement the precepts of Quality Air Force. Like it or not, this is a controversial topic. My 5 years experience in teaching/consulting in the quality arena has shown me that most people have a negative attitude about it, rolling their eyes and joking about all topics related to quality. I have, in the last 6 months, heard comments like: "We should stop teaching quality and start teaching leadership" and "Young folks today don't take responsibility for their actions...I blame quality." These ideas seem ridiculous to those of us who understand and are committed QAF. But to most Air Force members, quality is nothing more than spouting irrelevant theory and using a new

---

[1] USA Today

123

cache of buzzwords like: PAT, empowerment, Deming, Baldridge, QAFA, etc. Whereas all of the above are recognized as important components in a quality improvement program, the Air Force needs to stress the implementation of useful quality tools which can immediately amplify the quality problems in our systems. A great deal of our time is spent analyzing and acting on performance charts (usually bar charts), usually with a complete lack of understanding of system variation. We need to start exactly there! Virtually any chart we look at which attempts to provide "trend analysis," or engenders statements like, "We're up (or down) from last month," "what caused that spike?" or "we met the command standard, we must be OK." are candidates for the switch to control charts. That just about covers most of our key indicator charts!

Currently, the air force uses mainly bar charts to look for trends or performance versus some standard. The problems with bar charts are many. There is no long-term look at the process, no process average depicted. There is no way to tell if fluctuations are significant or not (we assume all are). They lead to waste of time and resources because we react to non-significant variation and miss signals of significant process changes. Bar charts are useful for some analysis, such as performance comparison. But they are not up to the task of critical and thorough trend analysis. Control charts are far better for that task. so why haven't we done just that? One main roadblock to the use of SPC has been that it is perceived as too complicated and as such, not feasible for use by the masses on a daily basis. Although complicated beneath the surface, SPC charts can be established and interpreted without the necessity of understanding all the "whys" and "wherefores" of statistics, just as most people can drive a car without having to be automotive experts. Just as we have to know how to do basic maintenance, such as adding gasoline, checking and adding oil, and checking tire pressure; we also need to know how to calculate control charts, know which chart to use, and how to interpret and act on the results of the chart. If you car does something you don't understand, you take it to a mechanic. If we have a question on control charts, we simply do the same thing, ask the expert (there should be someone in the quality office who can help).

So what is a control chart? Developed by Dr. Walter Shewhart in the 1930s, control charts are used to predict process performance by displaying the process average and amount of variation present in the process. World-class quality has been described as "On-target with minimum variation."[2] An understanding of variation can aid commanders in understanding system performance, extracting much more information about a process at a glance, enabling them to tell the difference between actual trends and "eye-balled" or imagined trends. The focus then shifts from detection to prediction/ prevention, and ultimately leads to resource savings.

Let's talk about this thing called "variation." Every repeatable process has variation. Some examples are: Snowflakes (no two look alike), your signature, the time you get to work each day, your speed on the highway, etc. As an example, write a lower-case cursive

---

[2] Understanding Variation

letter "a" three or four times: _____. You will notice that no two of them look alike! This is variation at work. **However**, those letters all come from the same process, your handwriting style. Even with variation present, all of your cursive letters "a" will look enough alike that a handwriting specialist could identify them as yours! This kind of variation is called "common-cause" variation. It is present in all processes, but the cause is a combination of *many* factors inside the process. The individual changes are nothing more than chance. It would make no sense for anyone to ask you why one "a" looks different from the one before it!

If a process displays only common-cause variation, it is a **mistake** to act on any individual fluctuation. There is another kind of variation called "assignable-cause." When a process has been influenced by something out-of-the-ordinary, then a change in the process has occurred. As an example, write some letters "a," then switch hands and write some more: _____. You should notice a significant difference between the two sets of letters. That is assignable-cause variation! You can "assign" the difference to the change in your handwriting process (change of hands). If your process displays assignable-cause variation, you should find out what the cause is and act on it.

So there are two kinds of variation: common cause, and assignable cause (sometimes called special cause). <u>Common Cause</u>: Inherent in all processes and comes from inside the process. Is the combination of many different factors designed into or allowed by the system. <u>Assignable Cause:</u> Comes from outside the process and is not "normal." Something other than chance caused a specific fluctuation or pattern. The consequences of failing to understand the difference between these two kinds of variation can be dire. Reacting to random fluctuations as if they were significant is called "<u>tampering</u>" with the process. This frequently results in the following: an "*increase*" in total variation; a waste of resources trying to report on something that isn't there; and frustration, fear, number chasing and "creative reporting" among the workers.

We tend to operate in a "binary world view."[3] We compare one thing against another and make huge assumptions based on the difference. We compare last month with this month. We compare this month with the same month last year. We compare this month with the command standard. But both numbers in that comparison are subject to variation, so how do we know if the difference is significant? For example, it was easy for us to see the difference in our cursive letters earlier because they were separated into their own groups. We were able to compare samples for two groups using several data points. But we don't do this in real life, mainly because of our binary view. Imagine how much more difficult it would be to detect a "significant" difference in our letters if we took only one from each sample and compared them. It would be virtually impossible to tell whether the difference was due to common-cause or assignable-cause variation! But this is how we look at our data every day.

---

[3] Understanding Variation

The reason for using control charts is to tell the difference between common-cause and assignable-cause variation. A common mistake managers make is to react to each change as if it were significant. But if the change is common-cause, it was just a chance (luck) fluctuation. As mentioned earlier, one of the most common effects of tampering is that the overall amount of variation increases, making the process less predictable. But the worst result is the waste of resources (time, manpower, etc...) seeking causes when none exist. This also causes stress and fear in the work place. All of this trouble... caused by an inability to tell the difference between the two kinds of variation.

So how do we tell the difference? Control charts to the rescue! There are six different types of control charts. Each has a unique purpose. The chart we must concentrate on using at first is called "the individual and moving range" chart (x/mR). The other charts can only be used with a certain type of data, which is sometimes difficult to identify. If you use the wrong chart with the wrong data, your chart will be wrong, and therefore, useless. But the x/mR chart may be used with any type of data...the universal chart, you might say. This concept allows us to make wide-spread use of the chart.

Once we become familiar with the correct useage of the other charts, it will be appropriate to use them, but not before.

X & mR charts come in two parts. The top chart is the actual process performance, and the bottom one charts the movement (range) between each point plotted. See Figure 1 as a generic example. To interpret a control chart there are several tests for assignable causes which you can apply. If no indication of an assignable cause is present, you should assume the process is stable and will continue to perform around the current average with *inevitable* variation between the two control limits. We can say with about 99.7% confidence that all data in the process will fall between these two lines (set at 3 standard deviations either side of the mean). There are seven standard tests for assignable causes. Initially, we can simplify the analysis by looking for the the three most visible signs. See figure 2. This will allow us to jump aboard and begin to use SPC quickly. Once we get used to it, we must add other tests to our toolboxes for a more thorough analysis of assignable causes.

THE X AND mR (moving range) CHART

note: If the lower control limit is a negative #, set it to zero.

x chart

note: The only test for special cause you use on the mR chart is whether a point exceeds a control limit.

mR

Figure.1

Control Chart Interpretation

Process average has changed (dropped)

Trend (process is changing)

Process has gone "out of control." Something not part of the normal process has caused this.

note: There are 4 other signals for ass. cause to be taught in a more advanced course.

Figure 2.

Your process has changed (assignable-cause variation) if:

- 7 points in a row remain on one side of the average line
- 5 points continuously increase or decrease (trend)
- A single point falls outside the control limits

If none of the above occur in your process, we may assume it is stable and predictable. That may not be good, but it is inevitable unless management directs changes in the process, or if something unexpected (out-of-the-ordinary) occurs. This is a "foot-stomper concept!"

Now some may say, "but I can't wait five or seven months to detect changes in the process." First of all, most of us already have one or two years worth of data on the books. Many of these signals are already there, waiting for a control chart to set them free. But the other answer may be to calculate data on a weekly or maybe even daily basis. I suspect that looking at data solely on a monthly basis is a paradigm we've fallen into, having very little to do with how frequently the data actually become available. We don't have to meet more frequently, just calculate differently. Much "monthly" data is really just daily or weekly numbers combined into a monthly average.

Let's take a look at an Air Force example. Our supply squadron had always tracked bench-stock availability. The command standard was 95%. See figure 3 for the "before" picture using the traditional bar chart.
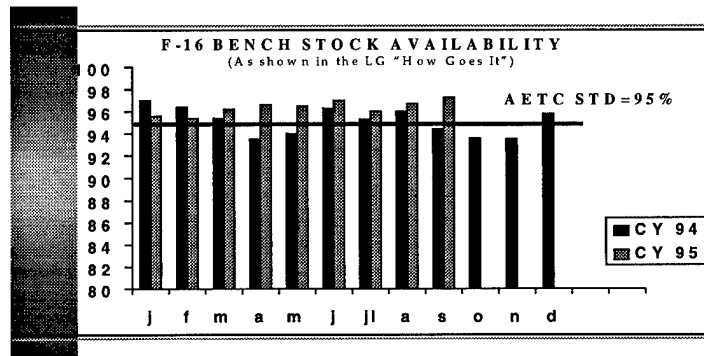
Figure 3

All we can really tell from this chart is that we've been doing pretty well for the last several months, exceeding the command standard. Are there any assignable causes? Where will we be next month?

We don't have any true way of answering these questions. Let's look at the control chart with the same data.

Figure 4.

128
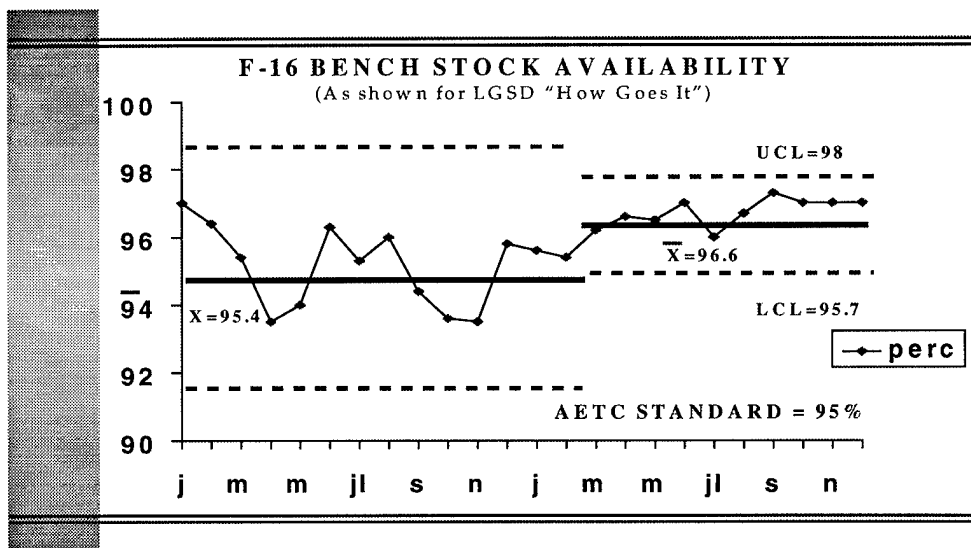
During the first 14 months, all we knew was that sometimes we met the standard, and sometimes we didn't. The typical answer was, "we don't have control over this." Regardless of this, we thought that when we exceeded the standard, that we must have done well, and if we fell short, something must have gone wrong. Both were false. First of all, during that period, the process displayed no evidence of significant process changes. There were no assignable causes. This means the process is "in statistical control." As mentioned earlier, this simply means that if left untouched, the process will perform predictably around an average of 95.4 with inevitable variation between the control limits of about 98% and just under 92%. This means we were GUARANTEED to fail to meet the standard about half the time. This tells us the process is not "capable" of meeting the standard. In December of 94, an improvement project was initiated at the suggestion of the Bench Stock NCOIC. We re-computed the chart when the performance stayed above the average seven times in a row (evidence of a change in the process...an assignable cause). The new process average was 96.6%, up from 95.4%. This is a significant, long-term change as opposed to the typically insignificant average increases we sometimes use in EPRs and award packages. Neverthe-less, nobody is going to look twice at a statement like, "Sgt Tinsley increased bench stock availability by 1.2%!" It sounds so insignificant. But what is the most significant item is the reduction in variation achieved by the improvement project that would normally go unno-ticed due to our lack of understanding of the importance of variation. The total process spread has decreased such that the command standard now falls outside the control limits! This means we can now *guarantee* (with 99.7% confidence) we will never bust the command standard again (assuming no big changes in the process)! We've gone from an *incapable* process to a completely capable process with a mere 1.2% improvement; gone from meeting the standard only half the time to meeting it all the time, and being able to predict future performance! Now that kind of information would be useful to me as a supervisor! That is significance of understanding variation.

I would now like to answer a few "frequently asked questions:"

"Can't you move those dotted lines where you want them?".........NO!!! They're calcu-lated from the data.

"Does 'out-of-tolerance' mean the same thing as 'out-of-control?'".......NO. Tolerance refers to standards set by command or local customers. "Control" is predictability, mea-sured with SPC chart.

" Do you mean that if my process is in control, it's OK?"......NO. It just means that if left alone, the process will continue to behave near its average with inevitable variation between the control limits. Only process improvement efforts (controlled by management) or some unexpected outside influence can change the chart!

"That spike must have been caused by something."......If the point in question passes all three tests for assignable cause variation, then there is no way you can say anything "out of the ordinary" caused the spike. The problem is that the process allows (and will continue to allow) too much variation as a matter of routine.

"Don't you have to have 20-30 numbers (data points) before you can make statistical analyses?" Answer: No! "5-7 data points are sufficient to calculate useful control limits."[4] These will be trial limits though. You should recalculate when you've got 15-18 data points."[5]

"Some books say you have to be certain of a normal distribution to use an XmR chart." Wrong! See "Myth One" about control charts in Wheeler/Chambers. " The control chart is essentially insensitive to this assumption."[6]

"What do the control limits (those dotted lines) represent?".....They represent 3 standard deviations either side of the x-bar line.

Other information you may need: There are 6 different types of control charts. For "variable" type data, you can use the X-bar and R or the x and mR charts. For attribute data, there are 4 charts available, P, nP, U, and C charts. One important point, however, is that in order to use an attribute chart, you <u>must</u> make sure the data comes from the proper distribution (either a binomial distribution, or a Poisson distribution), depending on the chart.

In summary, in order to more effectively use quality in daily operations, we should replace our bar-charts (where appropriate) with the x/mR control to examine our performance slides. Control charts can greatly increase the amount of process knowledge available to the commander at a glance, reduce wasted resources, increase trust in the work place by reducing the motivation of workers to chase numbers, and move us from a reactive management mode to a predictive/preventive one. Understanding the concepts of variation is relatively simple but extremely powerful in increasing the quality of operational results. In many ways, SPC is the answer to our quality woes.

Bibliography

USA TODAY, December, 1993 issue.

<u>Understanding Statistical Process Control</u>, Wheeler, Chambers, SPC Press Inc, Knoxville, TN, 1992.

<u>Understanding Variation,</u> Donald Wheeler, SPC Press Inc, Knoxville, TN, 1994.

"SPC Toolkit," by Donald Wheeler, *Quality Digest*, Chico CA, May, 1996.

---

[4] Understanding SPC
[5] Quality Progress
[6] Understanding SPC

Into The 21st Century With Strategic Planning...
Did You Take QAF Along?
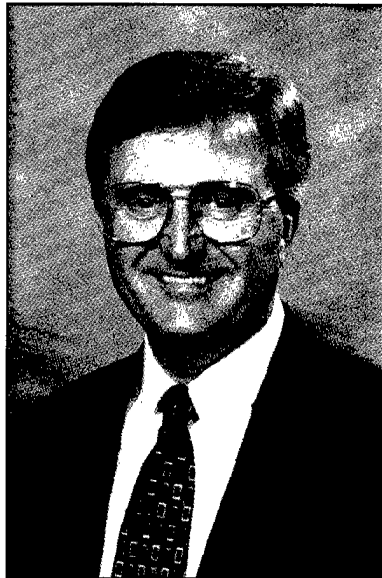
Mr Donald Sellars   Ms Donna M. Sizemore

Mr Donald Sellars is an analyst and consultant for Strategic Planning and Business Development at the Aeronautical Systems Center, Wright-Patterson AFB, Ohio. He completed the American Management Association's Strategic Planning and Implementing Strategic Plans courses, University Associates Applied Strategic Planning course, numerous government and non-government planning courses and a myriad of symposia and conferences related to strategic planning and business development. Don is a certified Quality Air Force examiner. He chaired the reviewing board for ASC's 1994 CSAF Team Quality Award candidates. Mr. Sellars has participated in workshops for Business Process Engineering with the Texas Instruments Corporation and most recently, with the Air Force Materiel Command.

Ms Donna Sizemore is the Assistant for Quality to the Director of Contracting, Aeronautical Systems Center, Wright-Patterson AFB, Ohio. Donna is responsible for administering cultural and customer satisfaction surveys, overseeing and facilitating the Operational Plan, , Unit Self Assessment and the Leadership Development Program. She facilitated the Aeronautical Systems Center's "Category Champion Team" in completing the Blueprint to ASC's future. She served as an Air force Examiner for the SECAF Unit Quality Award and has trained over 100 of ASC's senior leaders on conducting self assessments. Ms. Sizemore was the recipient of the USAF Outstanding Contracting Support Person for 1992 and will receive a Bachelor of Science Degree in Management in December 1996.

Into The 21st Century With Strategic Planning... Did You Take QAF Along?

Mr Donald L. Sellars
Aeronautical Systems Center Acquisition Policy Directorate
and
Ms Donna M. Sizemore
Aeronautical Systems Center Contracting Directorate

Abstract

It is sometimes difficult to connect our day-to-day activities and accomplishments with long range planning. As we operate under heavy pressures to accomplish every day tasks it is often hard to *"think strategically or corporately."* This paper describes a methodology to assure inclusion of Quality Air Force (QAF) activities into strategic planning. The Aeronautical Systems Center (ASC) is into it's second cycle of the Blueprint to ASC's Future, a 16-step continuous improvement model created by the leaders of ASC. A major aspect of the Blueprint is incorporating improvement areas that are identified from the Quality Air Force Assessment into the ASC Strategic Plan (Step 15 - Incorporate into Strategic Plan).

Most strategic planning approaches utilize an internal and external environmental scan. While the ASC Strategic Planning model utilizes both of these scans, an integral part of our internal scan includes data retrieved from results of the Unit Self Assessment (USA), Climate Survey, and Customer Feedback activities.

Purpose of the ASC Strategic Plan

The ultimate purpose of the ASC Strategic Plan is to provide the framework necessary for the development and fielding of weapon systems that will overcome any threat in any location at any time. This Plan supports national interests which are described for us in the Air Force Vision and Mission. To be successful, ASC must never lose it's unique capabilities in research, development and test, and our outstanding base operating support and medical services — these are the hallmarks of ASC! ASC must continue to reevaluate and reprioritize these capabilities and it's supporting processes to determine their overall value to accomplishing the mission. It has been a standard in ASC history to have the right people with the right skills at the time we needed them most, and ASC intends to maintain that standard now and in the future. The ASC Strategic Plan seeks to focus and intensify it's purpose, while directly supporting the vision, goals and objectives of the Air Force and Air

Force Materiel Command. It flows down through our entire workforce to all ASC personnel. The Plan looks to the future and, in a very systematic way, defines and identifies ASC's place in it.

Development of the ASC Strategic Plan

The first key element of our strategic plan was to identify a clear view of the future, our Vision. The **Vision of ASC** is to become the *Aerospace Research and Acquisition "Center of Choice" — The Birthplace, Home and Future of Aerospace.* ASC believes that their vision is one that supports an organization entrusted with ensuring the defense of its nation. "Center of Choice" is about *being the leader* in all of our areas of expertise.

ASC's **Mission** is to develop, acquire and sustain the world's best aerospace systems and provide all of our customers with superior products and services. In order to reach our vision and accomplish our mission, ASC has developed goals and objectives which are the focus of work at every level. To effectively support them, nine Strategic Focus Areas were created. Action plans have been developed to support each focus area; each defines for its particular subject matter, "Where We Are Now," "Where We Want To Be," and "What We Are Going To Do To Get There." Each action plan has an owner that reports to the ASC Strategic Planning Committee (SPC). The SPC reports quarterly to the ASC Council.

ASC Strategic Planning Model

A Strategic Planning Model was designed to provide a snapshot of ASC's planning approach. The model has four elements: External Environmental Scan, Internal Environmental Scan, Strategic Plan Development, and Strategic Plan Deployment. Our concentration for this paper is the Internal Environmental Scan as it relates to plan development. While there are many elements included in the internal scan, we will discuss the inclusion of Cultural Survey results, Unit Self Assessment results and Customer Feedback results. The numbers in parenthesis included in the model show a direct link to the Blueprint.

Incorporating Cultural Survey Results

A Cultural Survey Task Group is responsible for administering, training, and analyzing data related to the survey. An important element of their work is to provide recommendations to the Strategic Planning Committee for possible development of center level action plans to be included in the Strategic Plan. An example of a recommendation being incorporated into the Strategic Plan is to improve the human resources management process at ASC. The survey indicated current human resource activities at the Center were fragmented with no clear direction on human resource issues; hence, numerous offices providing

ASC Strategic Planning Model
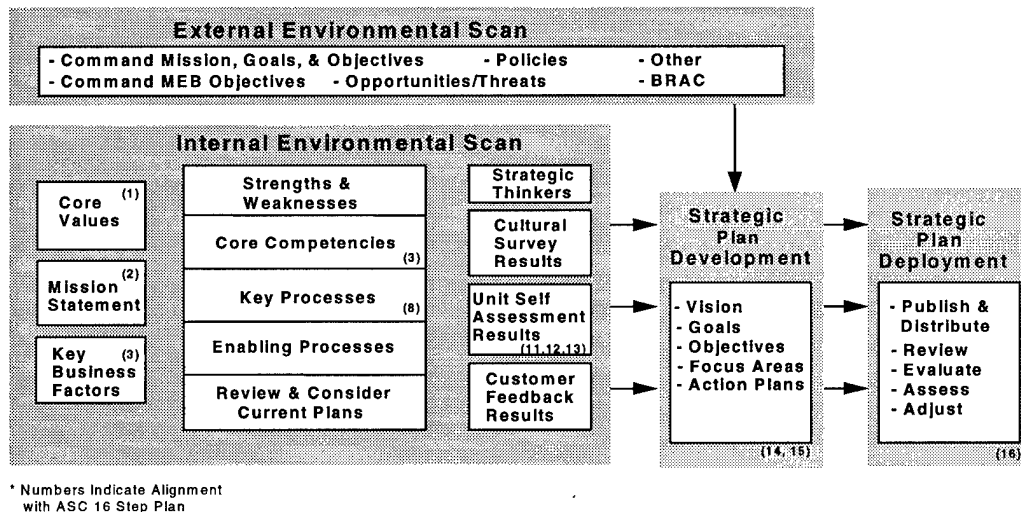
Figure 1: ASC Stratetgic Planning Model

direction on same or like tasks. As a result, a Center level action plan was created to provide a systematic approach to human resource management.

It is evident that our workforce faces many challenges as we look to the next century. Dramatic defense budget reductions, continued pressure for DoD downsizing and tri-service consolidation will all combine to create extraordinary demands on our workforce. The ASC strategy is to maintain a work environment for our people that attracts, develops, retains, and motivates the highest quality personnel.

The survey task force recommended a single human resource focus for the Center. This corporate level action plan resulted in the formation of a single human resource organization, Human Resources Directorate, ASC/HR. From this a single voice to the ASC community will be heard.

Incorporating Unit Self Assessment Results

A QAF Category Champion Team (CCT) was formed and is comprised of nine of the Center's most senior leaders: SESs, Colonels, and GM-15s. The CCT is chaired by an SES, vice chaired by a Colonel, and each of the seven Quality Air Force Criteria categories is championed by either an SES, Colonel or civilian equivalent. The CCT is the owner of the "Blueprint to ASC's Future" and reports directly to the Center Commander for all Unit Self

Assessment and related actions. A major aspect of the Blueprint is incorporating improvement areas that are identified from the Quality Air Force Assessment into the ASC Strategic Plan.

The Blueprint was specifically created at an offsite by the entire Leadership of ASC (Commander and all direct reports) to map our approach to Unit Self Assessment. This offsite was facilitated by a Senior Baldrige Examiner and resulted in a way for any organization to lay the foundation, pyramid the information downward, assess the organization, and provide a means for continuous improvement. The Defense Systems Electronic Group (DSEG) of Texas Instruments (TI) has told ASC that this Blueprint would have allowed them to achieve Malcolm Baldrige level status three to five years sooner than they were able to accomplish using their approach.

The 1995 ASC Unit Self Assessment results clearly indicated the need to focus the Center on process engineering, benchmarking, reinforcement of the Blueprint, and creating a customer satisfaction approach for the Center. For purposes of this paper, we will address reinforcement of the Blueprint.

An Action Plan was developed to revisit the focus and flow of the Blueprint to assure a continued positive direction for attaining a Quality Air Force environment. Early results of the Action Plan include decisions to maintain a Category Champion Team on a rotational basis at the current leadership level (18 months), focus on assessment gaps and explore future assessment approaches. Review of the Blueprint to ensure proper alignment with Quality Air Force and Center Quality and Planning activities is in progress.
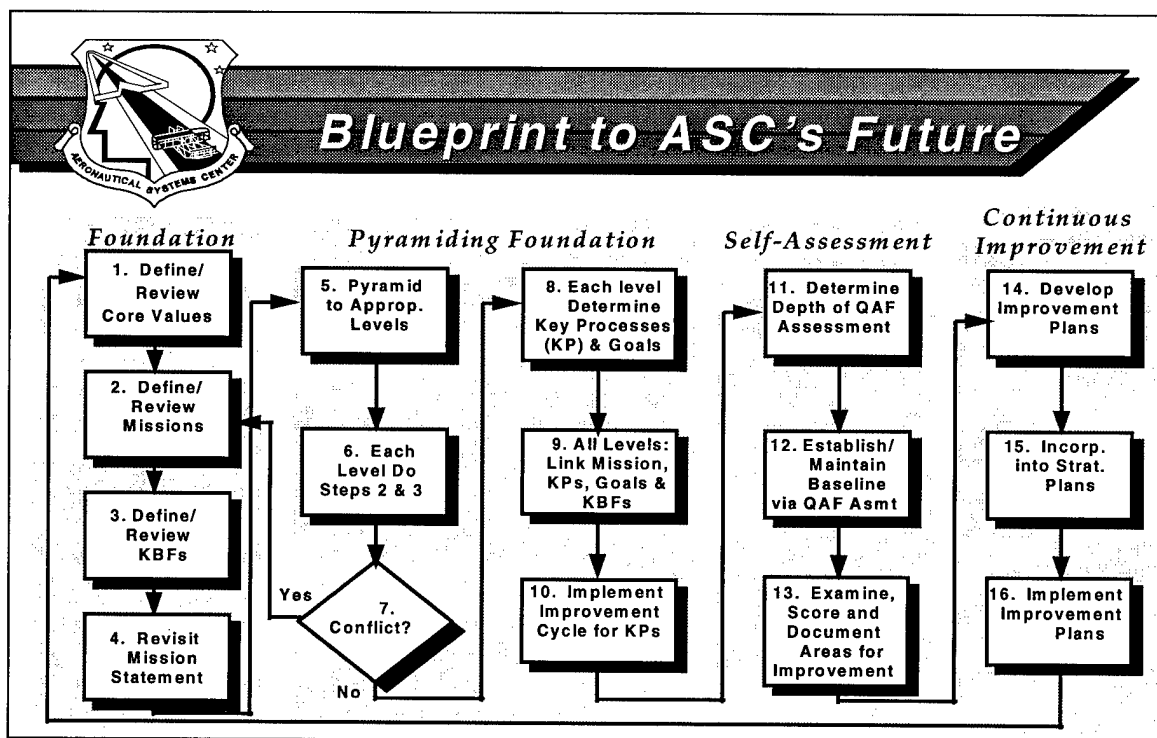
Figure 2: Blueprint to ASC's Future

135

Incorporating Customer Satisfaction Results

One of the primary goals of ASC is to enhance our reputation as a world-class supplier of quality products and services to our customer. In pursuit of this goal, the ASC Vice Commander, using a series of predetermined questions, conducted face-to-face customer satisfaction determination visits to establish our levels of performance. Feedback from major customers, primarily the using Commands, indicated a need for a single "door" or "telephone" to acquisition at ASC. Results of these sessions lead to the formation of a single acquisition focus at ASC; the Systems Acquisition Mission Unit (SAMU). This Mission Unit is made up of all functional organizations and the Systems Program Offices (SPOs) and is one of four that became the structure of ASC based on a senior leader Strategic Planning Offsite. Each person at ASC is a part of one of the Mission Units and all make up the ASC Team.
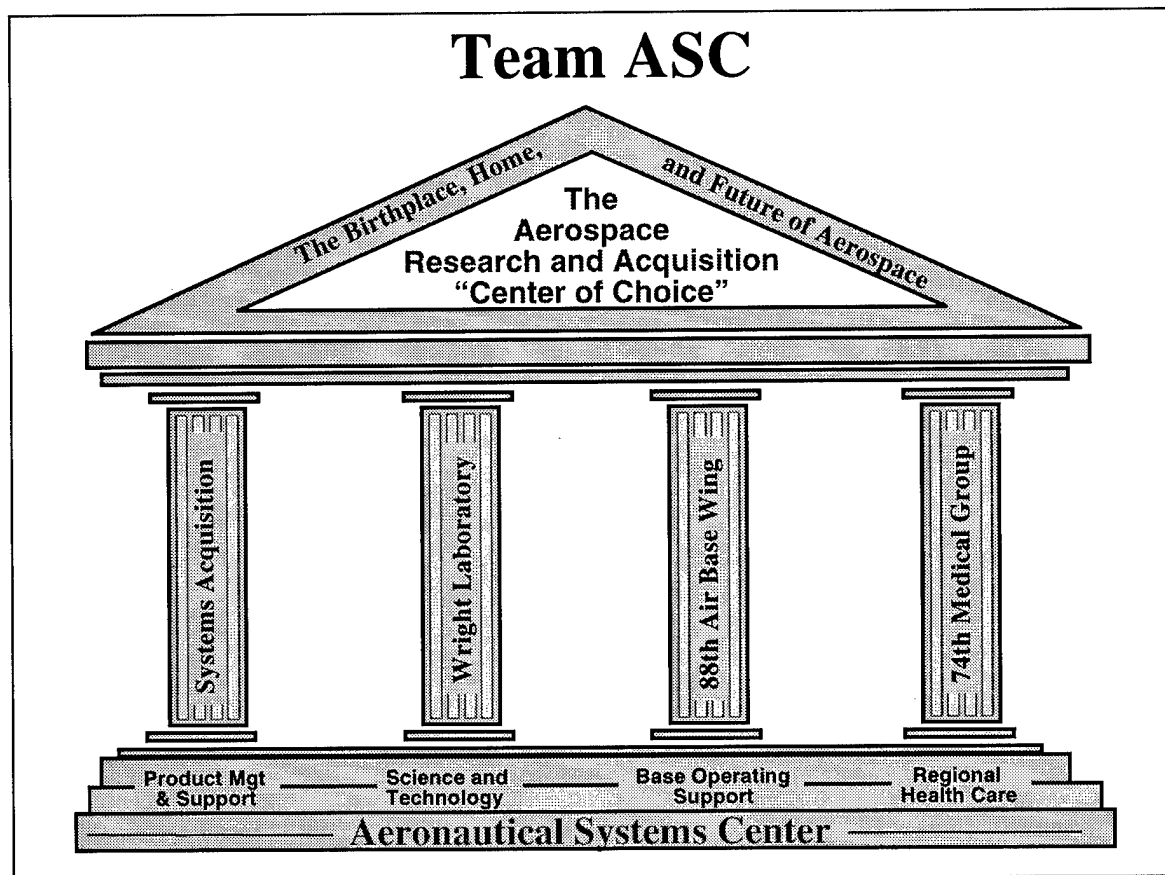
Figure 3: Team ASC

Summary

The intent of our work is to provide a common framework for Strategic Planning that does three things; 1) include all the necessary planning elements based on "today's" organizations, 2) has deployment actions that include review, evaluation, assessment and adjustment of the plans and planning activities and 3) can be used by any organization.

It is obvious to anybody involved in strategic planning that there are numerous models, methods, processes, maps and other forms of planning madness than most of us care to review. We believe that most of the planning methodologies would likely provide an acceptable level of success. However, we know that most organizations are struggling with ways to include the QAF Unit Self Assessment results, Cultural Survey results and Customer Feedback results in their strategic plans.

The work we have presented represents a proven methodology using all of the available planning elements and performance indicators necessary to craft the plans that will propel Aeronautical Systems Center into the 21st Century . . . we invite you to come with us.

Organizational Change Done Structurally
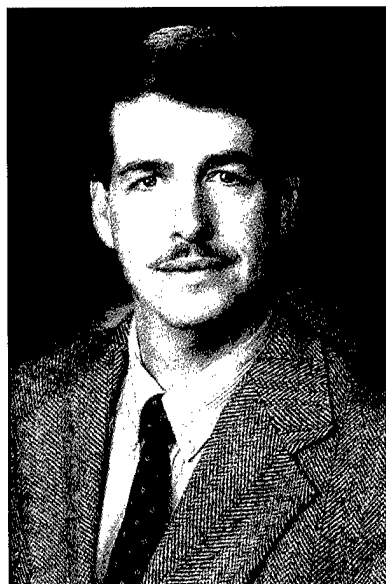
Mr John F. Wolverton   Lt Col Larry F. Willers (Ret)

John F. Wolverton received his B.S. in Electrical Engineering from Mississippi State University in 1985, he completed his Masters in International Relations and a Masters in Management from Troy State University in 1993 and 1994 respectively. He has completed Squadron Officers School in residence and Air Command & Staff College. He is a trained quality educator & facilitator receiving his training from such noted quality educators as Tennessee Associates, Coopers & Lybrand, Technologies for Creating, Innovation Associates, Robbins Research Institute, Jay Abraham Master Mind Marketing, Type Resources (MBTI), TFC Filming School.

Larry F. Willers retired from the Air Force as a Lt. Col. He holds a Bachelor of Science Degree in Business Administration from the University of Colorado and an MBA from the University of North Dakota. He is a graduate of Squadron Officers School, Air Command and Staff College, Air War College and the prestigious Defense Systems Management College Program Manager's Course. Lt Col. Willers has 23 years experience as an instructor and trainer and has been instrumental in Quality Air Force implementation since 1986.

Organizational Change Done Structurally

Lt. Col. (Ret.) Larry F. Willers and **John F. Wolverton**
Wright Laboratory, Eglin AFB, FL

Abstract

It is curious why similar organizations can implement Quality Air Force (QAF) methodologies in similar ways with such vastly differing results. The authors examine this apparent dichotomy showcasing the Air Force Materiel Command's Wright Laboratory Armament Directorate; a laboratory which develops technology for conventional armaments for the Air Force. It recounts how the directorate vigorously pursued QAF implementation. The result was a significant shift in the culture toward continual improvement, but no significant change to the actual processes of technology development. It was not until the directorate learned about and used **organizational structure** that significant improvement to work processes actually emerged. This paper describes the nature and role of structure within an organization. It is based on the pioneering work of author and consultant, Robert Fritz.

Introduction

Many organizations at all levels within the Air Force chain of command are dedicated to implementing the tenets of Quality Air Force (QAF). But, so often, when good ideas or process improvements are introduced into an organization, they fall flat or have significantly less impact than expected. Yet, these same ideas or processes often produce spectacular results in other organizations. How can that be? The answer lies not in the process or idea, but within the structure of the organization.

To successfully implement a QAF approach, it is necessary for an organization to identify what it wants to achieve. Elaborate processes have been developed to accomplish strategic planning or to define the organization's mission, vision, and goals. This simply identifies what the organization wants to produce. Knowing the difference between the organization's current condition and what it wants to achieve creates a positive tension. Known as structural tension, it is the driving force for achieving desired end-results. To understand structural tension, think about a time in your life when you wanted something so badly that you wouldn't allow your current situation to get in the way of achieving it. That impetus for action was structural tension. And, at the macro level, an organization can define it's purpose for existence in terms of an aligning principle. With this aligning principle, an organization can focus itself and all of its processes toward achieving its goals using structural tension.

However, some organizations adopt QAF as a problem-solving process. When used in this fashion, the organization would: 1) determine it's current condition, 2) do a detailed analysis, and 3) develop and implement process improvements. Process improvement methodologies are designed to find and eliminate imperfections. However, over time, fewer and fewer imperfections will be found as the improvements work. In this process, the motivating force becomes *inertia* and as employees "burn-out" so will the actions toward improvement.

The effectiveness of any Quality Air Force implementation is a function of the organization's motivation for improvement. The strategy will be much more effective if the organization uses structural tension as a generative force to attain its goals rather than attempting to problem solve its way to success.

Organizational Structure

In order to determine a good approach to QAF implementation, an organization must first be able to understand structure. Robert Fritz, in his latest book <u>Corporate Tides,</u> defines structure as,

> *an entity (such as an organization) made up of individual elements or parts*
> *(such as people, resources, aspirations, market trends, levels of competence,*
> *rewards systems, departmental mandates, and so on) that impact each other by*
> *the relationships they form. A structural relationship is one in which the vari-*
> *ous parts act upon each other, and consequently generate particular types of*
> *behavior.*

Understanding structure is not necessarily an easy task. Since most consultants are trained to examine an organization based on the problems and situations being faced, it is difficult for them to look at the basic relationships among organizational elements to determine how the organization actually functions. Based on his pioneering work, Mr. Fritz, trains consultants to examine an organization by studying the relationships and the tendencies for behavior which arise from them irrespective of any specific situation(s). This approach, known as structural consulting, is vastly different from traditional consulting techniques. It provides new insights into organizational behavior and has some major implications for any organization involved in or planning to implement a Quality Air Force approach. To enhance QAF implementation, an organization should:

1. Identify and understand the forces at play (the relationships between elements) within their structure in order to produce effective, long term improvement.

2. Be willing to determine (or reexamine) the bottom line purpose for the organization's existence.

3. Align the organization to fulfill the purpose for its existence through an aligning principle.

The fact is, no two organizations are exactly the same and any approach to continuous improvement must be tailored to the specific structure of that organization. Once the organization understands its structure, a viable course of action can be determined. In some cases, this will work within the structure that currently exists. In other cases, the structure must be changed (relationships altered) for the QAF approach to be effective. Refer to Appendix A for a more technical discussion about structure.

We will now examine how one organization learned about the role of structure and the actions it took to reaffirm its reason for existence and how it realigned itself to better fulfill its Air Force mission.

Background

The Wright Laboratory Armament Directorate has a rich history of success in developing technology for Air Force conventional weapons. Yet, seeking to be even better, the directorate started its journey on the road of quality implementation in early 1991. Just like many Air Force organizations, they hired a contractor to guide the implementation process. This contractor, with the directorate's senior leadership, developed the organization's mission and vision statements and outlined an initial set of seven major improvement goals. Champions were assigned to each goal and process improvement teams were chartered to make improvements. While the teams worked hard, most employees saw these efforts as a drain from the real work of technology development. And, for the most part, they were right. Over time, the organization gained an appreciation for continuous improvement. However, the Armament Directorate was unable to effectively apply these tools to their critical key processes.

The New Direction

In 1994, a new director was assigned to the organization. With his focus on long-term planning, he asked some very insightful and timely questions:

1. By what criteria do we judge the need for or quality of our current programs?

2. How do our programs meet the needs of the warfighter?

3. If we have to reduce our assigned manpower, what programs would be terminated?

The Director received much advice about what programs should continue to be funded and grand explanations about how each program would help the customer. However, he could find no systemic approach to deciding which technologies to pursue. So he asked the leadership to examine the basic purpose for the organization's existence and to outline the key processes through which work is accomplished. It was determined that the role of the organization is to "be the leader in technology development for air launched conventional armaments for the Air Force." And, there are only three key processes which the Armament Directorate accomplishes to fulfill its role. These are:

1. Technical Planning - the annual planning to determine technology programs to continue and which new programs to fund.

2. Research and development - the actual process of producing the technology.

3. Technical support - assisting their customers to solve problems in areas where they have expertise.

In addition, there is a process to sustain the key processes over time as well as the business and support processes which enable the three key processes to be accomplished. Appendix B provides an in-depth discussion of the Armament Directorate's Strategic Planning and Business Model.

The Director found he had qualified people to accomplish the research and development and to provide the technical support. The only weak link was the technical planning of the programs to be executed and their relevance to meeting Air Force warfighter needs. He needed a way to focus the efforts of the directorate so that every employee, when asked, could explain what they do and how it contributes to meeting the warfighters' needs. He needed a central focus from which criteria could be derived to make systemic programmatic decisions.

The Director, with the aid of Robert Fritz, began to examine the structure and the forces at play within his organization. He discovered that technology had long been developed in a "stovepipe" environment. That is, each major discipline needed within a weapon (i.e. ordnance, guidance, aerodynamics, etc.) developed their technologies essentially independent of the other disciplines. This set up a "competition" for resources, both people and money. When both were plentiful, technology development flourished. However, as manpower and funding declined, it was harder to decide which technology efforts to pursue. Somehow, the organization needed to learn to develop weapon technology by capitalizing on the synergy of integrating the technologies for maximum effect. This meant developing technologies not in a stovepipe but by integrating efforts across the disciplines. Thus, technical planning needed to be accomplished across the disciplines while execution of the research and development still needed to be accomplished within the stovepipe. The decision was made to establish the focus by developing a set of integrating concepts based on warfighter requirements.

142

Integrating Concepts

Working within an already existing planning structure, the Directorate's Technical Directors were asked to study the deficiencies identified by the warfighters. They were then to derive numerous attributes which, when satisfied, would eliminate one or more deficiencies. For example, if the warfighter could not destroy a deeply buried enemy bunker, an attribute to satisfy that deficiency might be the ability to penetrate 15 feet of reinforced concrete. Likewise, if the warfighter needs to destroy a reinforced bridge with one sortie, an attribute might be the ability for a weapon to hit within 3 meters of the designated aim point on the structure. After defining the appropriate attributes to satisfy the warfighting deficiencies, the Technical Directors could then outline a number of notional concepts around which the organization could focus its technology development. The defining of attributes was a new way of thinking about weapon technology development. Most of the Technical Directors looked at this as a relatively useless exercise and a drain from their other (more important) duties. But an amazing thing occurred as they were pulling this information together. It began to make sense. The Technical Directors could see that if these attributes were met, they could actually satisfy the customer. And, it could be an excellent tool for evaluating their on-going technical work and determining how their current programs would support the users' needs. Thus, the integrating concepts became the focus around which technical planning would be accomplished. But, if he used integrating concepts as a tool, the Director knew he would have to restructure the organization to make the new planning process drive the actual research and development process. The structure he chose to use to implement this change was Integrating Concept Integrated Product Teams (ICIPTs).

Integrating Concept Integrated Product Teams (ICIPTs)

Within the Air Force Materiel Command (AFMC), key team processes are implemented through Integrated Product Teams (IPTs). This is, in essence, an adaptation of the more general concept of self-directed work teams. IPTs are formed to ensure all required aspects of a project are represented and that the work accomplished is fully integrated. The Armament Directorate formed an IPT for each of the notional weapons concepts it had derived from studying stated warfighter deficiencies. A leader was assigned to each IPT. Figure 5.1 depicts the organizational change which was made to accommodate the introduction of Integrating Concept Integrated Product Teams (ICIPTs). The teams are constituted from members of each of the product divisions. Collectively, these IPTs are accountable to the Directorate's senior leadership for integrated technology program planning. In their product divisions, however, these same team members are accountable to their division hierarchy for actual technology development. The cross-functional nature of the ICIPTs is truly a structural change enabling the Armament Directorate to focus its development planning toward meeting the needs of the warfighters. The major components of the structural change required to effect alignment of the organization included:

1. Moving technology (program) planning from a stovepipe division process to an integrated team approach.

2. Continuing to produce technology within a division structure with this being the primary role of the division chief.

3. Providing adequate programmatic and technical review before final Director approval.

4. Realigning processes to address the dual roles played by division members as both technology developers and as members of the Integrating Concept IPTs.
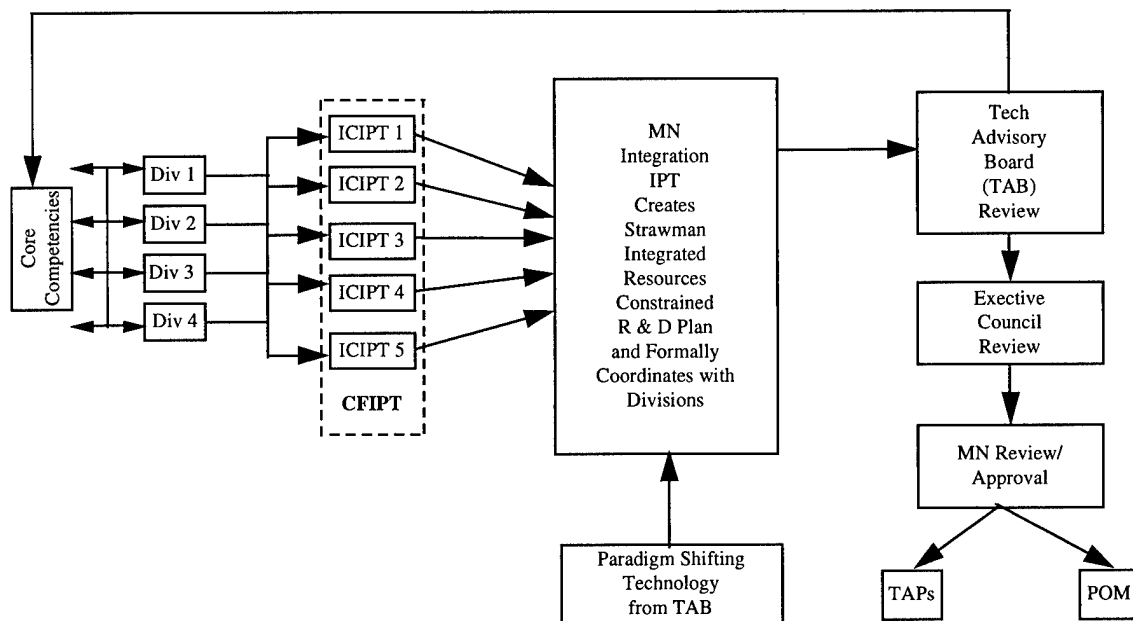
Figure 5.1 WL/MN Strategic Planning Process

Organizational Structure

The long-standing organizational structure of the Armament Directorate was limiting its ability to accomplish long range strategic planning. While good localized planning was being accomplished within each division, this often was suboptimal when considering an integrated weapon concept. Better program development could be accomplished by study-ing the published deficiencies as defined by the warfighter. By determining appropriate attributes to meet, technology programs could better meet the warfighter's real require-ments. Removing the planning function from the stovepipe technology divisions also re-duced the structural tendency to fight for scarce resources. The need for given technologies can now be more systemically derived and allocation of resources can be determined at the

directorate rather than the division level. This is accomplished by integrating the requirements of each of the Integrating Concepts and maximizing the development of technologies which are pervasive across all of the concepts. This overall integration function is critical to optimizing the program planning.

Conclusion

The Wright Laboratory Armament Directorate has made tremendous progress in the last 6 years implementing quality. While they were able to make basic changes to the organization's culture, for the first 5 years they were unable to fundamentally change the way they met user requirements. It was not until they learned to examine the organization's structure and its tendencies for behavior that they were able to make significant progress toward improving their technology planning and development. To effect the desired improvement, the structure of the Armament Directorate needed to be altered to most effectively accomplish and execute strategic planning. Integrating concepts is the vision around which the organization now focuses on the needs of the warfighter. This provides the vital link to determine where limited budget and manpower can best be used to produce the most cost effective technologies. The integrating concepts and the attributes they outline are the mechanism by which the technology development is focused. The aligning principle however, is the organizational desire to determine and meet the needs of the warfighters, and the will to align their processes to best use their resources to that end. The importance of the aligning principle to focus the organization cannot be overstated. As they implement Integrating Concept Integrated Product Teams, employees are becoming more excited that the organization has a systemic approach to planning and that they can finally see where their efforts fit into the big picture.

In the case of the Armament Directorate, relatively minor structural changes were made to the organization's hierarchical reporting chain. These changes, however, are destined to have a major impact on the Directorate's effectiveness in meeting warfighter technology needs.

Appendix A

Structure within an Organization

According to Fritz, structure is a relationship between elements. In this context, we are not talking about organizational structure as it relates to hierarchy, but instead how elements affect each other to form relationships. Thus, a structural relationship is where the association of the elements affect each other. However, not all relationships are structural. For example, a loose association of elements (i.e. coins in a coin collection, people in a social club, or books in a bookcase) whose elements do not effect each other would not be considered a structure. If, in an organization, two or more elements affect each other, they form a

structural relationship. This is where different parts of the organization interact with each other to form the structure (Accounting with Engineering, Supervisor with Employee, Company with Customer, etc.) Each of these elements and their affect on each other make up the structure of the organization.

These relationships can be examined at a very elementary level. Let's say you have a report you must produce. Currently, it isn't done. There is a tension created between the end result you want (the report) and the current reality that it is not yet accomplished. This tension produces a tendency for action to move toward the end result of accomplishing the report. This is an example of the basic building block of structure, the Tension-Resolution (T-R) system as shown in Figure 7.1.
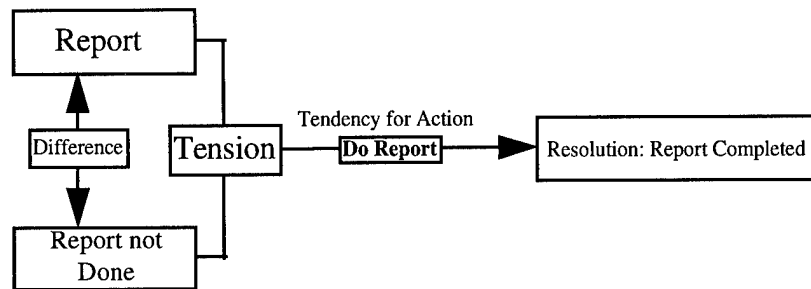
Figure 7.1 Simple Tension - Resolution System (T-R Model)

When the difference between a desired end result and the current state produces action which results in creating the end result, this is known as a **resolving structure**. Another example of a simple T-R system is hunger. We are hungry, so we eat. This is also a resolving structure. But what if we are overweight and want to become thinner? Of course, we diet. And this forms a second T-R system.
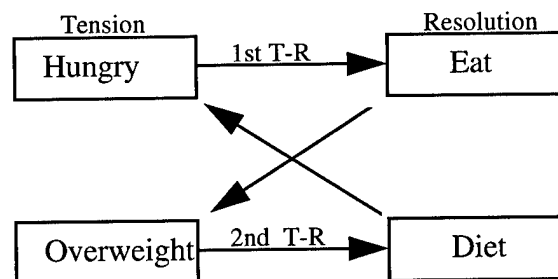
Figure 8.1: T-R System in Structural Conflict

146

Now, referring to Figure 8.1, if we look at the relationship between the two Tension-Resolution systems, we find an interesting conflict. In the first T-R system, you're hungry (tension) so you eat (resolution). In the second T-R system, you are overweight (tension) so you diet (resolution). If moving toward resolution in one T-R system sets up a tension in another T-R system, we have what is called **structural conflict**. In our example, it causes us to oscillate between eating and dieting. Thus, a structural conflict creates an oscillating rather than a resolving structure. This oscillation will continue as long as you remain in that structure.

Many organizations implementing QAF find themselves in an oscillating structure. They have a desire for positive change(tension), but as they move toward implementation such as QAF (resolution), they see little immediate payoff. With little payoff (tension), there is the tendency to move back to the status quo (resolution). But this often sets up a new tension for wanting positive change. The effect can be numerous "false starts" in pursuing continuous improvement. As shown in Figure 8.2, this same oscillating pattern has been seen within the Air Force over the decades with the introduction of numerous improvement processes such as Zero Defects, Management by Objectives, and TQM.
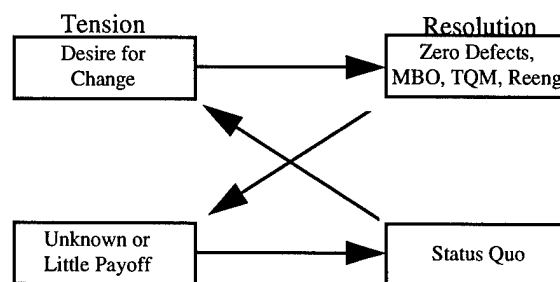
Figure 8.2: Organizational Oscillation

147

Appendix B

The Strategic Planning and Business Model

The Armament Directorate has three key processes as depicted in the model in Figure 9.1.
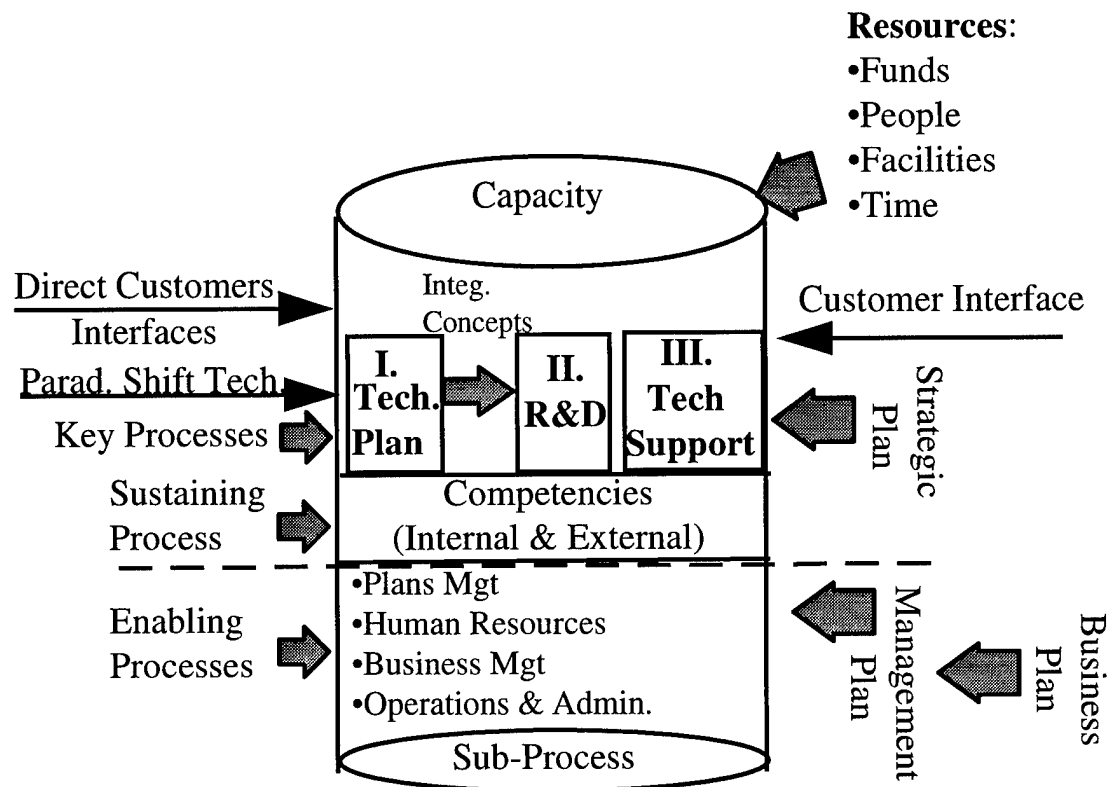
Figure 9.1: WL/MN Strategic Planning & Business Model

The first process is Technology Planning. It is through this key process that the organization determines its customers' technology requirements. Some of this process occurs outside the Armament Directorate as part of a Technology Master Process. Stated requirements are examined and common deficiencies or themes are identified. It is from that examination that deficiencies are categorized into notional concepts from which they can derive a set of attributes which characterize the deficiencies. That is to say, if the Armament Directorate could fulfill an attribute, they could reduce or eliminate a warfighter deficiency. The notional concepts are known as integrating concepts and the approach to meeting the attributes focuses the actual Research and Development, which is their second key process. Technology can be developed in one of two ways. The majority of the development is done by contracting with large aerospace contractors, academia, or small businesses to develop given technologies. In addition, some of the technology is developed in-house by government researchers. The mix of in-house research and contracted research requires the Directorate to manage its resources carefully. The third key process is Technical Support. Given

the expertise of the staff, the organization is sometimes called upon by its customers to solve real-time technical problems. This support is provided to meet user needs in the short term. The mission of the Armament Directorate is to be the Air Force leader in development of technology for air launched conventional weapons. In order to meet that role, it must either maintain an expertise in all functional areas in-house or strike alliances with outside agencies to provide that expertise when needed. Maintaining an across-the-board competency base sustains the organization's long-term viability. Coupling this sustaining process with the three key processes allows the directorate to accomplish evolutionary technology development.

However, what about revolutionary ideas? The directorate insures that a paradigm shifting technology idea does not get lost, and fosters independent research to explore these new and potentially revolutionary approaches. Finally, no organization can flourish without the business infrastructure. Those processes which allow the organization to accomplish their three key processes are known as enabling processes. These processes include financial systems, personnel processes, and other normal business functions.

Bibliography

Fritz, Robert, **Corporate Tides**, Berrett-Koehler; 1996, San Francisco, CA

Fritz, Robert, **The Path of Least Resistance**, Ballantine Books, 1989, New York, NY

Certification: Ensuring Quality Is Deployed To The Lowest Level
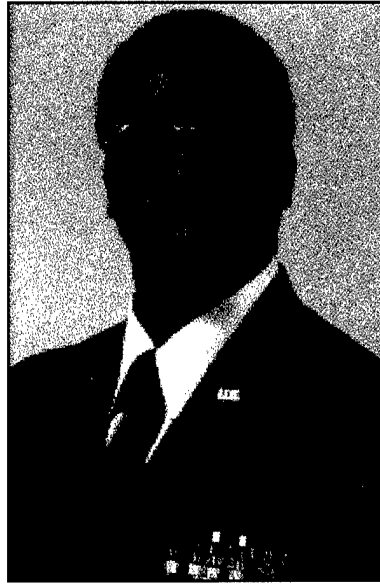
Capt Hilton Smith, Jr.

Capt Hilton Smith, Jr., Chief, Quality Improvement & Readiness, earned a Masters Degree in Human Resources Management from Webster University. Hilton served as a consultant/instructor at Wright-Patterson AFB's Center for Quality Education. He developed seven workbooks *Understanding the Quality Air Force (QAF) Quality Criteria* designed to help units better use this information when conducting USAs. His paper, *Organizational Culture's Impact on QAF* was published and presented at the '95 QAF Symposium. Hilton served as an Examiner for the 1996 *Secretary of the Air Force Unit Quality Award.*

Certification: Ensuring Quality Is Deployed To The Lowest Level

Capt. Hilton Smith, Jr.
Lajes Field, Azores, Portugal

Abstract

Over the years the Air Force's implementation of Quality Air Force (QAF) has shown varying degrees of success. In its truest form QAF is the ability to institute a managerial style throughout an organization that focuses on mission accomplishment by increasing participation at all levels. While this is great in theory, there is some concern of how well the concepts and practices of QAF are being deployed and used at the grassroots level.

It has been long thought that senior leadership is the key to the successful implementation of quality management. This is true, but senior leadership alone will not ensure its success. There comes a time when we must move from theory to practical application. Even more important, we must be able to verify (or prove) that these principles do produce results that contribute to mission accomplishment.

One way to achieve this goal is to design and implement a system that provides squadron commanders proof that QAF has been deployed within their work centers. It should also show how that deployment contributes to the squadron, group, and wing's success. One such system is the *Lajes Quality Work Center Certification* Program.

This paper is a review of the *Lajes Quality Work Center Certification* Program. It will highlight the leadership driven development, successes and drawbacks to this innovative approach to further ensure QAF becomes the way we do business.

Introduction

Quality Air Force (QAF) is the ability to institute a managerial style throughout an organization that focuses on mission accomplishment by increasing participation at all levels. It has been long thought that senior leadership is the key to the successful implementation of quality management. While this is true, senior leadership alone will not ensure its success. Individuals at every level must contribute on a day-to-day basis to its success. It is this concept of everyone at every level being actively involved that truly determines QAF's ultimate success. The politically correct word for this in the quality arena is *Deployment.*

151

Deployment is the extent to which workers at lower levels participate in those activities that directly contributes to mission accomplishment and continuous improvement. This participation, collectively, is what makes an organization meet or exceed mission requirements. Believing an organization has fully adopted the concept of QAF is one thing, and being able to prove it, systematically, is quite another.

Organizations in the Air Force annually conduct Unit Self-Assessments (USA) and periodically undergo a Quality Air Force Assessment (QAFA). These processes are designed to "assess" our current status with how well we understand and use the Quality Air Force concepts. Perhaps we must look beyond the pomp and circumstance surrounding these annual or periodic events. We may be better served by knowing, on a real time basis, that we are indeed using an operating style aligned with the concepts of QAF.

During USAs and QAFAs the idea of deployment also plays a critical role. Within the context of a USA or QAFA, it is important to show how well approaches (processes, plans, or procedures) are implemented across the organization. A good approach does not equate to success if no one in the organization is aware of it or using it. The same holds true for the general implementation of QAF (vs. USAs or QAFAs). If people at the working level are not using the tools and/or techniques to improve processes, than the gap between what we want to do and how well we are doing it is enormous. The negative fallout is that "lip service abounds."

Organizations must feel comfortable in knowing how well the concepts and activities of QAF are deployed throughout. To get this sense of how we are doing concerning deploying quality to the lowest level, we have developed the *Lajes Quality Work Center Certification* Program.

In June 1994 a question arose during a high-level meeting back in the states. "As leaders we understand the benefits of implementing the concepts of QAF, but how can we know it is deployed and being used at the work level within our units?" This question did not fall on deaf ears. Col. Brian A. Arnold, Commander, 65th Air Base Wing, asked himself, "How did we know when a pilot was ready to be trusted to serve in a formation? Or how about a missileer before he or she started pulling alerts?" The answer was the development of a process that certified a work center's approach to quality in much the same way operators certified to perform their duties.

This was fine, however, there was not an existing certification process that would realistically determine if a group, squadron, or work center used the concepts and tools of QAF. We needed a systematic way of certifying units, keeping in mind the bottom line of our quality style is to improve our processes and focus on customer satisfaction.

Col. Arnold challenged the Executive Council to look for ways to certify work centers and provide squadron commander's evidence that the concepts and practices of QAF have been successfully deployed down to the lowest level of their organization. The only stipulations were the certification process must be easy, applicable to any work center, verifiable and above all, credible.

The work center level was agreed upon because it is at this level where the greatest benefits can be derived from the successful implementation of QAF.

To be a "Certified Work Center" is not taken lightly. It means being recognized as an organization that uses QAF, and is able to improve processes systematically. This also means being a shinning example of how well a work center can benefit and support the goals, objectives and mission of the wing.

Criteria Development

Keeping in mind the conditions stated above the developers of the criteria were faced with upholding credibility-ensuring he entire process did not turn into a "dog and pony show."

First they had to determine at what level of an organization should be certified. It was decided that the work center level would be most appropriate. A work center (another universal term is shop element) is a unit usually consisting of 3 to 12 people. An example would be the Equipment Maintenance Branch (AGE). This level was chosen because it's at this level where the real work is done in most organizations. Successful involvement and continuous improvements at this level will, collectively, aggregate up to benefit the squadron, group and eventually the wing. The work center level is truly where the rubber meets the road. Individuals here are actively involved in day-to-day processes that exemplify the very essence of continuous improvement, and can see how this concept works in real-life situations.

The next thing to do was determine the level of the certifying official. This was a serious concern because the wrong choice could undermine the certification process. If we decided to have the wing or group commanders conduct the certification, we could run the risk of the entire process becoming nothing more than an "expression of how well we can fill the blocks of the criteria." A work center would need only to ensure it has followed the checklist and put on a good presentation to the certifying official to become certified. This situation would also hold true if the Chief of the Quality Improvement Office conducted the certification. While this person is the "functional expert" of the criteria, he or she is still to far removed from the work center to conduct the certification.

We chose what we felt to be the only logical choice, the squadron commander. This determination was based on the mind set that who ever certifies a work center must be familiar enough to see the whole picture.

While adhering to the basic "quality oriented" criteria is important to become certified, it hardly ensures certification. There are a number of non-tangible factors that affect productivity that must also be taken under consideration for a work center to become certified. It is the squadron commander who is in the key position to be aware of these non-tangible factors.

For example, if a work center is experiencing disciplinary problems or internal strife exists, it is hard to imagine how it can operate at maximum capacity. These types of situations traditionally have a negative impact on morale, communication, and eventually productivity. The squadron commander, through normal channels, usually is made aware of such situation. This is not always the case for the group or wing commanders, or quality advisor. These individuals could possible be blinded by the pomp and circumstance surrounding the certification briefing.

The squadron commander must seriously take under consideration the entire working environment when conducting the certification process. The bottom line is the productivity level should be of no surprise to him or her. The certification process is a systematic way of showing the "nuts & bolts" of how the work center got to be productive.

Accountability and/or measuring the success rate of the program was the next order of business. Having recently concluded the fourth revision of our wing strategic plan, we had to see if this program was going to help or hurt our efforts to reach the goals we set for ourselves. One of the wing's Key Result Areas is *"Transition to a Quality Air Force."* The goal states "Proactively meet customer desires through fact based decision making, commitment to continuous improvement, and individual empowerment at every level." This is followed by the first objective, "Continually involve workers in the process of quality improvement through proper training and application at all work centers." It was the phase "application at all work centers" that gave the development group the guidance to determine how to measure the success of this objective, and thereby see the impact and value of the certification process. The development group focused on tracking the number of work centers certified since the program was implemented. The actual measurement chart shows the number of work centers certified over time (**Fig 1**). In addition, it allows the Executive Council to track the number (not the name) of work centers certified. Although this information is available, its absence decreases the concern to get work center certified just to increase the numbers.

Certified Work Centers.
Figures are accumulative

| 30 |
| 25 |
| 20 |
| 15 |
| 10 |
| 5 |
| 0 |

3rd 4th 1st 2nd 3rd 4th 1st 2nd 3rd
Qrt Qrt Qrt Qrt Qrt Qrt Qrt Qrt Qrt
94 94 95 95 95 95 96 96 96
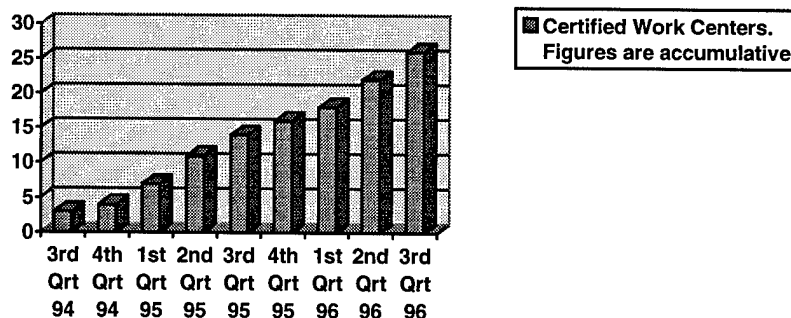
Figure 1

This figure also exemplifies the expression "what gets measured gets done." It was not unit late December that the measurement chart was developed. Work centers throughout the wing began seeing the progression of their co-workers. This information, along with traditional productivity measures, showed there was a correlation between being certified, increased productivity, and ultimately the implementation of QAF.

Certification Criteria

As the number of work centers increased there was a natural increase in the curiosity about the process and criteria of the program. Like other innovative ventures in the QAF arena this was no surprise and was anticipated. While the *Lajes Quality Work Center Certification* Program is not as comprehensive as the Malcolm Baldrige Award or the ISO 9000 Certification process, it draws upon the two of them to ensure solid criteria is used to determine the usefulness of it. All three focus on increased productivity through the proper use of resources (financial, manpower, material, etc.). Developing the specific (and minimal) criteria took time and required we look at areas that brought to light the accomplishments of the work center while not trivializing the process.

Satisfying the requirements of the certification process is fairly straightforward. The certifying work center will present evidence that QAF has been successfully deployed within their organization by using, but not limited to the following criteria. Each of the minimal criteria requirements will be followed by a brief explanation about why it was selected.

- *Displaying Wing and Unit Strategic Plans (s) and each person has working knowledge of them.* While displaying these documents is easy, ensuring and showing workers know where they fit into the picture is another matter. The importance of each person's personal knowledge is clear. If a worker is knowledgeable of these plans they can better understand how their processes support the plan and improvements that effects them.

- *All workers understand how metrics and/or Quality Performance Measures are used to measure each objective.* The objectives established in the wing and units' strategic plan must be measurable. The metrics and/or Quality Performance Measures (QPMs) are necessary to ensure the unit is systematically moving in the desirable direction to meet the objectives. If workers are unable to recognize their impact on the processes, they will likely fail to know how to make positive contributions to improve them.

- *Show how results are analyzed and changes are made as a result of the analysis to seek continuous measurable improvements.* This step allows a unit show that the results of improvement efforts had the desired impact. Change for change's sake often causes frustration, however, when change occurs as a result of a systematic approach all members see the value and want to become involved. When you can see the results, analyze them, and show how they positively, you will have measurable continuous improvement.

- *Ensure a COPIS (customer, outputs, processes, inputs, and supplier) study is completed. Processes should be documented, and a simple flow diagram displayed.* Before a work center can improve a process (or customer satisfaction) they must first be able to identify those processes and customers. Going through the COPIS process is essential in identifying these critical components. A work center is not obligated to use the established COPIS model. They are free to use any number of commercial products (i.e. LeranerFirstTM Process Management) or the *Jump Start* Program.[1] The key is to have critical processes and customers identified and have documentation of those items. Part of this process requires the flow charting of these processes. This often starts creative juices flowing and can have a positive impact.

- *Customer feedback is solicited, feedback forms are used, and the unit demonstrates how customer feedback is used to drive improvements. Also, customer satisfaction policy letter is clearly displayed.* This is an imperative step in providing customer satisfaction. Without understanding and using customer feedback it is unlikely that you can truly know if you are on track or miles away. This step shows that the unit is correctly focused on the customer and not on improving processes that are only a convenience to the work center. Providing proof that they are customer focused will be a great benefit during Unit Self-Assessment or Quality Air Force Assessments.

- *Benchmarking concepts are understood and efforts are being made to properly implement them.* While on the surface benchmarking is a simple process, many people have proven it is not easy to put into practice. Knowing how to apply the principles of benchmarking (especially in an isolated environment like Lajes) shows an advanced level of resourcefulness. This is needed to come up with innovative ideas and ways of looking at improvement efforts. Providing proof that the work center has a clear understanding of

---

[1] The LearnerFirst Process Management Software is a product of LearnerFirst, Inc. The Jump Start Program was developed by the Office of Quality Improvement at Altus AFB, OK. The concept was presented at the 1993 Quality Air Force Symposium. See the proceedings for more details. Both along with the COPIS process provide much needed information concerning key processes and customers.

the concepts on benchmarking shows an effort has been made to move beyond the basic quality training of "Awareness and Teams & Tools."

- *Unit Mission Statement is displayed, understood, and that individuals can tie their unit's mission and how they play a part in the success in the wing's mission.* This step closely related to the first step in that it requires a display of a statement. A lack of a clear mission can result in a lack of organizational guidance. A work center's understanding of its mission and how plays a role in the success of the group or wing is vitally important in providing that guidance.

- *USA is completed, results are being used to continually improve processes, and changes are documented.* This is the universally accepted method to validate that process improvement is part of the way an organization does business. The hardest part of this step is to show how the results of the USA are being used to improve work center processes. However, if the documentation is present, it becomes obvious that the results played a part in the work center's successes. This can be verified at subsequent assessments.

- *Quality Awareness Training is 100 percent completed and Teams & Tools is 30 percent complete.* Since the beginning of the quality journey the importance of training has been very clear. If people do not understand about the concepts of quality management, there is no way they can properly apply them. It is also important to reinforce the training. One way is not only day-to-day application, but the availability of follow-on training. Teams and Tools training provide some additional information about the proper effectiveness of quality management. Thirty percent of a work center usually equates to a large number of individuals (2 for a 6 person shop) trained in this class. This means if these procedures are encouraged they can have a lasting affect on the work center.

- *In addition to the above criteria, work center will provide the certifying official any job related practices that incorporate quality principles.* This step addresses the many non-tangible elements that affect the productivity levels of work centers. It is at this time that other factors must be considered. The previous nine areas of the certification criteria are important, however, if all these are being met and productivity, morale, and mission effectiveness are down, someone is trying to blow smoke at someone.

When the work center feels they have satisfied the above requirements they will schedule to meet with their squadron commander for a Quality Work Center Certification. Work centers will provide a briefing addressing their activities relating to the successful implementation of QAF. Each member of the work center should be able to explain their role in the process.

A question and answer period will follow the briefing. Squadron commanders must be satisfied quality management is truly deployed to all levels and improvements are evident. At this point they are awarded a certificate stating they are a **_Quality Work Center._** **_(Fig 2)_**

Figure 2

Successes and Drawbacks

As with any new approach to prove the effectiveness of QAF, the certification program, did not happen without its problems. While the initial concept made sense the program did not take off like a rocket. In fact, there was some anxiety until we saw it in action for ourselves.

In August 1994, Gen. John M. Loh, ACC Commander, came to visit Lajes Field. Col. Arnold presented the certification idea to Gen. Loh. With the Gen.'s knowledge of quality management, there was some concern on his part as to what exactly we were certifying. Col. Arnold explained the process actually verifies the level of deployment that has occurred within a squadron.

In the end, Gen. Loh apprehensively agreed to look at the process. We walked into the Secure Communication/Small Computer Section of the 65th Communications Group, this was to be the first work center to give the certification briefing. The young men assigned to the secure comm section did an outstanding job. Gen. Loh and his staff saw first hand what evidence the certification process provided in terms of proving QAF was alive and well.

This presentation not only impressed the Gen. (but also us as well) that this certification process did in fact have validity. Without a doubt there was some fine tuning to do, however, we felt we were on he right track.

Despite the success with Gen. Loh and the number of requests throughout the command concerning this process, there was still some misgivings about it. For instance, it was presented to the ACC IG Team in October 1994. They understood the validity of it but failed to identify it as an ACC benchmark. This caused some discouragement among members of the wing. Getting this to fall in that category would have given it a great deal of legitimacy. Unfortunately the IG's action was misinterpreted. Their reluctance to make it a benchmark was based solely on the time the program was in place not because of the program itself. Wing units saw the IG's action as a message that the certification process was without merit. This caused a number of work center's to become less enthusiastic about the certification process. As a result of this decision, few work centers were willing to go through the grueling process of becoming certified.

Even with its slow start the program is making a resurgence. A number of work centers are inquiring about the criteria, including information about the work centers that have successfully become certified. These along with the measurement devices in place we are beginning to experience more work centers are indeed going through the certification process. Most importantly these work centers themselves are seeing the advantages of being certified. Certified units find the process of a USA is much easier. Work processes are more easily identified (and the intangible measurement) morale is clearly improved.

The future of the program is bright. Upcoming changes show how work centers will be held at a higher more demanding standard. Combining requirements from the *Air Force Quality Criteria* and the *ISO 9000 Standards* ensures the program will focus on results, customers, and continuous improvement.

Conclusion

Successful implementation of Quality Air Force requires an even balance between leadership commitment, total involvement of workers at every level, and last but not least a verifiable measurement process. As for the latter we have in place a number of tools at our disposal to ensure the two former ones are actually occurring. These tools range from USAs, QAFAs, Cultural/Leadership Surveys, etc. This unique process is nothing more than another tool in the toolbox to help us build a better Air Force.

Verifying that people are actively involved in the quality process is an arduous task, but without a doubt a needed one. It is imperative that leaders at all levels know that they are not wasting resources and their time on something that not being used.

The *Lajes Quality Work Center Certification* Program, while different, has proven to be on the right track in providing proof that QAF affects the bottom line-mission accomplishment. In the year since its implementation the overall management culture has reflected one that is more conducive to the principles of quality. This is not by accident. A dynamic program that brings life to the quality concept is bound to have that kind of effect.

However, it should be noted that like anything in the quality world this program is a living entity. This gives the program the ability to grow and change, as it already has. So far these changes have been for the better. It is hoped that the future changes will enhance the validity of this program. Further showing QAF is a valuable way to continue to be "The world most respected Air Force."

Using The Integration Definition For Function Modeling (IDEF-0) In Air Force Work Methods Improvement

Mr Larry A. Rose   Lt Joseph G. Crance

Mr. Larry Rose is assigned to the Air Force Management Engineering Agency, Randolph AFB, TX. as a Reengineering/Functional Process Improvement Branch Chief. He attained his M.A. Personnel Management from Central Michigan University in 1984. His current duties involve leading process improvement teams for Air Force logistics, conducting benchmarking efforts in finding "Best in Class" processes from industry and analyzing processes using computer-aided process models and simulation techniques. He has forty years in military (CMSgt (ret)) and federal civil service.

1st Lieutenant Joseph G. Crance is a Team Leader for functional process improvement (reengineering) team assigned to the Air Force Management Engineering Agency. He holds a B.S. in Industrial Technology from Southern Illinois University, as well as A.A.S. in Electrical Technology, Corning Community College, and Survival and Rescue Operations from the Community College of the Air Force. Lt Crance has been a key player in several Wing/Air Force level studies to include aircraft maintenance (12 FTW), the Base Supply Modernization Effort (SSG, Maxwell AFB), Supply/Transportation Feasibility Study (SAF proposal), and the Hazardous Material Pharmacy (HQ USAF/LGMM.) He has also aided civilian and military communities to understand the benefits of statistical process control, work methods improvement, and Just-In-Time inventory management. He has been a member of the Institute of Industrial Engineers since February 1992.

161

Using The Integration Definition For Function Modeling (IDEF-0) In Air Force Work Methods Improvement

Mr. Larry Rose & Lt Joe Crance
Randolph AFB, Texas

Abstract

As the painful downsizing of the DoD continues, Air Force members will naturally become more resistant to change. Stress and pain will move people to "crave a period of stability."[1] It's very important to recognize the frailties of human behavior, respect their feelings, and understand their need for personal stability. While addressing their concerns and feeling, one must try to make them understand the Air Force must move into the 21st century. There is a lot to accomplish, and we all should discourage complacency. Breaking long-standing regulations and putting customer needs above organizational stovepiping can enhance nearly any Air Force process. Using IDEF tools and investigating processes that cross organizational and mission boundaries are ways to enhance our Air Force that continues to become smaller in terms of resources .

For work methods improvement to be successful, those attempting to improve a process must have a system's view. IDEF-0, when properly analyzed, provides this view. Combining some of the best aspects of other quality tools, IDEF-0 provides management engineers a great deal of flexibility. Careful analysis of inputs, outputs, controls, and mechanisms in place today aid the transition from the AS-IS world to the TO-BE organization. This article proposes a macro approach to make this transition using this relative newcomer—IDEF-0 and traditional work methods improvement techniques.

Should your organization require assistance with functional process improvement, the Air Force Management Engineering Agency (AFMEA) stands ready as your in-house consultants. AFMEA's mission is to ensure the best possible use of Air Force resources through development and application of process improvement tools and techniques in partnership with our customers. IDEF-0 is one of many tools we apply.

---

[1] Ralph M. Barnes, <u>Motion and Time Study and Measurement of Work, 7th ed.</u>, (John Wiley & Sons, New York) 1980 p. 54.

Some consultants would have us believe work methods engineering is a new science. Whether we call it Business Process Reengineering, Functional Process Improvement, Business Enterprise Integration, etc., work methods improvement has been around for a very long time. Frederick Taylor, widely recognized as one of the founders of Industrial Engineering, began studying methods engineering nearly a century ago. His empirical research led to the better design of tools and engineering principles that are still of great value today. Flow process charts, proper facility planning, motion and time studies, and statistical process control have been complemented by a host of other powerful tools, disciplines, and techniques to include computer simulation, the IDEF methodologies, ergonomics, and activity based costing.

However, give credit where credit is due. The Quality gurus- Deming, Crosby, and Juran- (as well as keen international competition) focused America back to the importance of customer loyalty through superior quality. Employee empowerment and satisfaction were no longer the well-kept secret of successful enterprises, and the need for teamwork through the application of Total Quality Management, as emphasized by General Bill Creech, USAF (ret), brought into focus management's responsibility to step in as roles of mentors and coaches versus task masters. Hammer and Champy started a landslide of massive change, even coining the term 'reengineering'—work methods improvement at the macro level—affecting varied tasks and entire systemic processes simultaneously; consequently, the need arose for organized change management on scales heretofore unknown.

The Proliferation of Quality Tools

Just about everyone has jumped on the quality bandwagon. Different tools and techniques were fielded by educators and consultants at a dizzying rate. Flow charting of specific processes, Ishikawa (fishbone) diagrams, run charts, story boarding, etc. began to boggle the minds of those trying to implement 'quality.' Walls were covered with these charts, but visual pictures of the targeted process were often still hard to see. A tool was needed integrating the idea of process flow; a tool that could clearly identify specific resources, controls, and products associated within a particular activity. That tool, a relative newcomer introduced in late 1970s, was IDEF.

So What Is IDEF?

IDEF combines some of the best aspects of flow charting and fishbone diagrams. IDEF-0 is a computer-assisted model that is available commercially through many different software vendors. Before we can explore the advantages of an IDEF model, however, we need to define the objectives and some of the common terms found in Federal Information Process

Standard Publication (FIPS PUB) 183—the federal standard produced by the US Department of Commerce driving IDEF methodology.

Objectives: FIPS PUB 183 provides us a succinct definition: "[IDEF-0 will]...provide a means for completely and consistently modeling functions (activities, actions, processes, operations) required by a *system* [italics added] or enterprise, and the functional relationships and data (information or objects) that support the integration of these functions...The use of this standard is strongly recommended for projects that... Require a modeling technique for analysis, development, re-engineering, integration, or acquisition of information [or any other types of] systems..."

Activity - a process performed by a function(s).

ICOM- Acronym for Input, Control, Output, Mechanism

Input - an item that is acted upon in some way within an activity that is either transformed in a process to an output or totally consumed during the process.

Control - a policy, law, or other directive dictating how, when, where, who, or why a activity is performed, why an input is worked upon or consumed, a mechanism used, or an output produced.

Output - the end result of an activity. For a activity to be considered value added, an output is necessary.

Mechanism - Equipment, personnel, software, tool, or facilities used to accomplish a specific activity.

(See Figure 1 for clarification.)

Activities are represented by a box. Inside the box a modeler, one who builds the IDEF-0 model, places a brief description of the process. Further description of the process is possible (and recommended) by adding notes and definitions. ICOMs are depicted by arrows. Inputs always enter an activity from the left hand side; outputs exit the activity from the right hand side; controls enter the activity from the top, while mechanisms always enter the activity from the bottom.

Activities are broken down in a hierarchical fashion. The process is further defined the 'deeper' you go into the model. The highest level of the diagram is a single box referred to as the A-0 diagram. Below the A-0 diagram the process begins to become more specific. The current screen you view are the 'parent' activities, and all activities decomposed below these boxes are referred to as 'children.' Parents and children are numbered for easy reference. For example, say the activity 'Prepares Pizza' is given the reference number 11.

Decomposed beneath this activity are the children: 'Obtain Ingredients', 'Mix Ingredients', and 'Cook Ingredients' and these activities are given the corresponding box numbers 111, 112, and 113.

Why Accomplish the IDEF-0 As Is Model?

Start from scratch! Blank sheet reengineering! Don't allow the paradigms of the current model fog your thinking! These statements are meant to take the blinders off creativity, but they ignore a staunch reality: the mechanisms in place today can not be separated from the process, or the realities change management imposes. The AS IS model is a snapshot of the processes as they exist today. The TO BE model is the goal that directs the transformation of the AS IS. Blank sheet reengineering fails to analyze the current process and organizational structure and subsequently denies the reality of legacy systems, shared resources, and ultimately exposes implementation to unnecessary risks. Innovation *should* be unbridled, but implementation must have a foot firmly planted in the AS-IS and TO-BE worlds. To allow for proper change management, the AS-IS should be viewed as the appropriate springboard—to allow for dynamic and radical change, the AS IS should not be viewed as a brick wall.
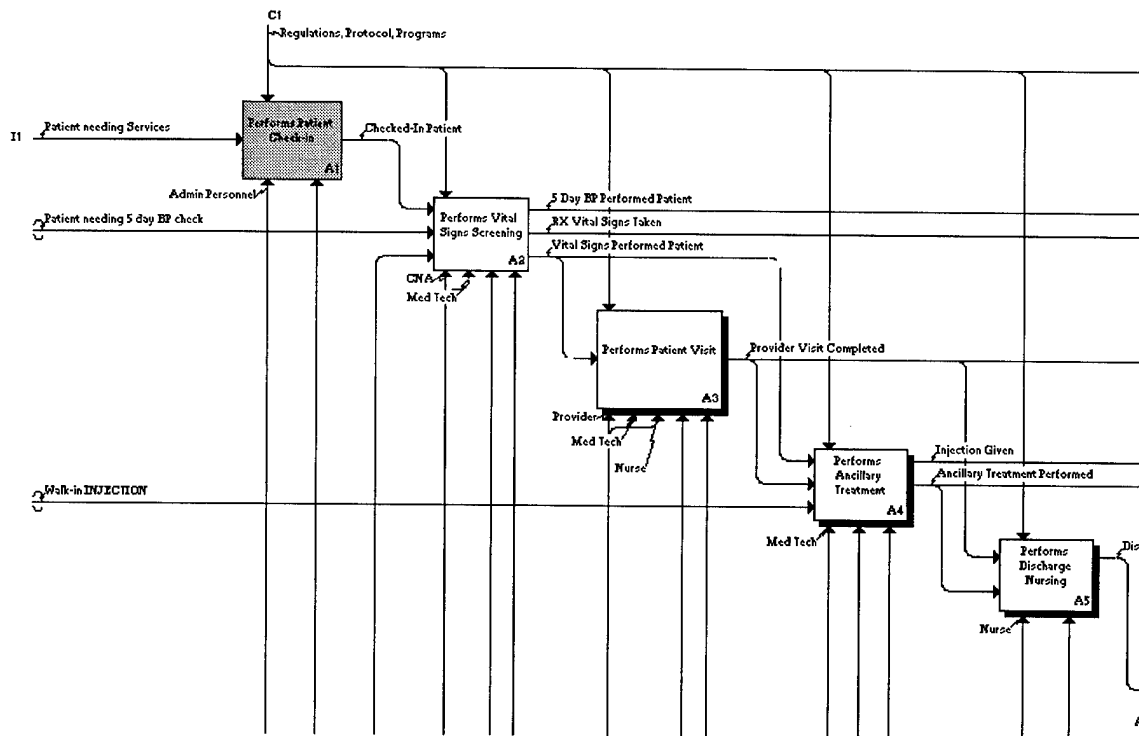
Figure 1: (Compliments of LtCol Mary Ann Olson, Wilford Hall Medical Center HMO)

Interrogating the As Is Model
General Guidance on
Thinking Out-of-the-Box or the Art of Questioning 'Why?'

The AS IS IDEF-0 model allows an initial high level observation of a process and shows interrelationships between activities. Inputs, outputs, various rules and restrictions (controls), and mechanisms are depicted to complete the process. Having IDEF software will *not* create breakthrough ideas. IDEF facilitates a methodical look at a function/process to determine where improvements can possibly occur. Using IDEF can help determine if eliminating or changing a process will affect some other activity or what control changes may be necessary.

Unfortunately, most people are not trained in 'out-of-the-box' thinking. In most organizations, people are encouraged to fix problems and enhance what they are responsible for; however, this often leads to sub-optimization of the system as a whole. As an example, improvements in cycle time in one process often create bottlenecks later since managers of downstream processes have not improved their cycle time (throughput). IDEF provides a system view. Process flow may become visible to organizations stove piped by their Air Force Specialty Code for the first time. Inputs and outputs on the AS IS model particularly show customer/supplier interfaces. (Take heed: building an IDEF model without principle suppliers and customers is akin to throwing darts in the dark. You may hit the target, but you'll never be sure! Note from some battle-scarred IDEF users: if you don't have your major customers and suppliers with you as you build your model, you'll fight the battle of 'buy-in' with these organizations—and that's an uphill battle!)

The definition of reengineering is contained in the phrase "fundamental rethinking." One reengineering procedure is to challenge the old process by asking why it was established to work the way it is (AS IS). Ralph M. Barnes suggested every step, every movement should be questioned[2] as to the usefulness from a system's view. Masaaki Imai coined the Japanese term '*Kaizen*' to this process and took root cause analysis for problem solving to a higher level.

When a process is challenged, sometimes the absence of an explanation or the provided rationale becomes so ridiculous in today's environment, a reengineering idea blossoms during the development of the AS IS IDEF model. Case in point, during a recent feasibility workshop concerning the consolidation of Base Supply and Transportation, a challenge was entertained concerning the quarterly re-inspection of all installation vehicles required by Transportation after the IDEF model depicted the vehicles had been previously inspected by unit level vehicle control officers. The follow-on discussion on quality concepts led to a recommendation to eliminate the duplicated inspection costs. Capture these insights as they occur for future developments of the TO-BE model.

---

[2] Barnes, p. 50.

Interrogating the 'As Is' Model
A specific taxonomy

Ralph Barnes listed the basic tenets[3] of work methods improvement in four (somewhat deceptively) simple steps:

(1) Eliminate unnecessary steps
(2) Combine tasks
(3) Change the sequence steps/processes are performed
(4) Simplify [the hardest to accomplish] whatever remains

Applying Barnes methodology to each component of an IDEF model, the ICOMs in particular, and asking some tough questions of the AS-IS Model, we can begin development of the TO-BE model.

Applying work methods improvement methodology to IDEF outputs. Start with the outputs (products)! If you can eliminate some or all of the outputs of a particular activity, you will inherently reduce workload and *possibly* reduce system cycle time. Attack outputs by questioning:

- Does the customer need the output?
- Can I replace the output with another simpler, cheaper product? (simplify)
- Can I reduce output quantity and still meet customer needs? (partial elimination)
- Does the output have a historically high scrap or rework rate?
- Do I need all the elements of the output? (Information brokers take note, less is better!)
- What is the effect of eliminating the output downstream?
- What does each activity add to the output? Can I skip an activity?
- Are there activities with similar outputs? Can we eliminate some (all) of this duplication?

Applying work methods improvements to Inputs. Whereas outputs are focused on customers needs, inputs shifts our view to the supplier. Supplier quality directly affects your output quality and your cycle time. (One quick glance at the requirements at the international quality standard ISO 9000 will show you the importance of monitoring your suppliers.) AF logisticians focus on supply chain management to reduce lead times, thus reducing inventory and the subsequent carrying costs—and we all have suppliers, logistician or not. Analysis of inputs can be very revealing:

- How does the input improve my output? If it doesn't, why am I using it?
- What is my incoming defect rate?

---

[3]Barnes, p. 50.

— Am I using my scarce man-hours by inspecting for poor input quality?
— Am I using my scarce man-hours by an unnecessary or duplicating an inspection?
— In both of the previous cases, can I introduce statistical sampling plans to reduce this burden?

- Am I receiving the input on time? At the right time ? (sequence)
— Do I know the lead time to get my necessary input?
(Note: If we're actually talking about materiel vs. information/data in this instance, and you answered 'no', you have an inventory problem.)

- Am I receiving more than I need, or that I can handle? Can I increase my capacity? (See mechanisms.)

Applying work methods improvements to controls. Herein lies the greatest opportunity to improve your process, for often it is the self-imposed managerial, regulatory or statutory guidance that gums up the works! The phrase 'because the regulations say so' is invalid. Question everything! Submit changes through the Air Force Suggestion Program, or put in an AFTO Form 22 for technical orders challenging current procedures. Use HQ USAF functional personnel to work through legislative liaison offices on changing legal requirements or obtaining waivers.

Further interrogate the controls by asking:

- Can I *increase* workload *intervals* (often dictated by controls) and not affect quality? For example, can daily inspections be pushed to weekly or even monthly?

- How do controls affect my cycle time?

- Would changing sequence of controls reduce waiting lines? (Maybe these processes must be accomplished, but can I change the order to more effectively schedule my time?)

- Am I organized by AFSC (stove-piped) or by process according to current controls? Cross functional teams have proven very effective. Is recurring workload such that I should organize by process?

— Remember: organizational lines often cause barriers to production flow subsequently causing queues. Controls dictate how we're organized, and if elements, sections, flights, or even squadrons can be consolidated because process and workload would show a smoother production flow, then combine!

168

Applying work methods improvement to mechanisms. Here is fertile ground for simplification! Mechanisms reflect resources such as facilities, manpower, and tools used to accomplish the job. Ask yourself:

- Can I substitute manpower mechanisms for a given task with automation? For example, are people doing mundane tasks that could be replaced by bar coding, automatic palletizers, robotics (not as far-fetched as you may think), computers, etc.

- How are my facilities affecting my process? Do I have unnecessary or long travel distances between activities? (Remember production flow!) In most instances, travel time is dead time!

- Am I using the right tool? One of the author's college professors increased production by 25% in a Canadian furniture factory. How did he do it? Did he add computers? Robotics? Re-tool the factory? No, he did by using magnetized screwdriver tips (@ a cost of $10/tip). How did this improve production? Workers putting in the screws no longer dropped the screws they were working with; thus he eliminated time workers spent searching for dropped screws as well as freeing up the worker's other hand!

- Are the environmental conditions affecting my workers?

- Are materials used that are hazardous? Can they be replaced, reduced or eliminated?
    — If you eliminate the need for personnel protective equipment, you save time and money!

Work methods improvement applied to activities. Just glancing at the IDEF model will show you the activities that are potentially consuming the most resources (a cost sink, if you will), or receiving the most inputs (a potential bottleneck). By determining the man-hours associated with each major activity will help determine the activity to concentrate an investigative effort on. The activities selected can then be decomposed into sub-processes for further review or challenge.

The Future: Reengineering and IDEF-0

The old phrase "work smarter, not harder" is hackneyed but appropriate. IDEF models can lead the way for reengineering. Reengineering is about *work* :the redesign of work so it can be performed in a more efficient and effective manner. The Air Force functional hierarchies, the responsibilities and accountabilities duplicated at various levels (sometimes mirror images) can be investigated by using a methodical IDEF approach, challenged and if feasible changed. A prime source of assistance is the Air Force Management Engineering Agency. Their mission is to ensure the best possible use of Air Force resources through

development and application of process improvement tools and techniques in partnership with their customers. They have many success stories. There are many roadblocks to reengineering but looking towards the 21st century and evolving technologies and missions, IDEF modeling combined with the host of other quality methods will provide Air Force leadership the capability to improve organizations and processes in the coming years.

Recommended Reading
Works Cited

On work methods improvement/reengineering:

Masaaki Imai, _Kaizen: The Key to Japan's Competitive Success_, (McGraw Hill, St. Louis) 1986 pp. 259.

Barnes, Ralph M., _Motion and Time Study and Measurement of Work, 7th ed._, (John Wiley & Sons, New York) 1980 pp. 689.

Hammer, Michael & Steven A. Stanton, _The Reengineering Revolution: A Handbook, 1st ed._, (Harper Business) 1995

On IDEF methodology:

Integration Definition for Function Modeling (IDEF-0) (US Department of Commerce, Technology Administration, National Institute of Standards and Technology) Dec 1993 pp. 80.

On change management:

Schwartz, James B., _The Hunters and the Hunted: A Non-Linear Solution for Reengineering in the Workplace_, (Productivity Press, Portland) 1994 pp. 550.

Air Force publications:

AF Manual 38-208 Vol. II, _Air Force Management Engineering Program (MEP) - Quantification Tools_, Air Force Management Engineering Agency (AFMEA) Mar 1995

Other:

Creech, Bill, _The Five Pillars of TQM_, (Truman Talley Books/Dutton, New York) 1994

Innovation In Rewards And Recognition:
A Systems Approach

Lt Col Francis E. McIntire (Ret)

Lt Col Francis E. McIntire served as the Deputy Director, Headquarters Air Force Space Command and Deputy Commander, Air Force Quality Institute. He champions a systems approach for the implementation of Quality Air Force. Highlights include the Education and Training Architecture, an integrated processes for strategic planning and Unit Self Assessment, customer focus and satisfaction, rewards and recognition, and an integrated training plan. Consultant to Air Force senior leadership.

Innovation In Rewards And Recognition: A Systems Approach

Lt Col Francis E. McIntire (Ret)

Abstract

The senior leader in any organization must fulfill a variety of roles and responsibilities. One very important responsibility of senior leaders is to provide a system-wide reward and recognition program which provides feedback to members and serves as a motivational vehicle to reinforce productive behavior. The purpose, as always is to ensure that leaders provide a culture in which organizational members achieve results.

Recognition and rewards is the name given to a hierarchy of activities and programs which reflect the culture of the organization and reinforce certain behaviors. As always, certain elements are more highly valued than others. As the hierarchy is developed we will take the opportunity to "turn the pyramid upside down" or on its side to examine the importance of certain "lesser" elements. In a high-tech society we tend to place higher value on the more sophisticated elements of any initiative. In recognition and rewards the avant-garde methods will rise to the top, but this implies that they must be supported by a foundation of traditional, results-getting methods which generally have their roots in the low-tech arena of human nature.

This topic is examined to ensure that leaders at all levels are taking responsibility for developing and managing an effective recognition and rewards program.

Introduction

Behaviors are the method by which results are achieved — so the leader must reinforce positive behaviors and eliminate the roadblocks that inhibit performance. One method of fostering positive behavior is the establishment and administration of an effective recognition and rewards system. Most organizations have elements which are surprisingly complex but do not capture the full spectrum. One example is the U.S. Air Force awards and decorations program which includes a data base, computer generated eligibility report, standardized award format and approval process, wide array of decorations and eligibility criteria, approval hierarchy based on significance of award, protocol for presenting the award, and standard for wearing the decoration.

Recognition

The need for recognition is a basic element of human motivation. In an attempt to transcend our gaps in understanding the intangible nature of recognition two common mistakes are evident. When describing examples of recognition it is tempting to present only the most salient and tangible examples of rewards. Examples: cash awards, year-end bonus, ornate trophies and plaques, awards banquets, parades, and gold watches. These are good examples and have the look and feel of recognition but are actually a physical representation of an intangible and very powerful dynamic of human nature. Also missing from a typical array of rewards are the more basic and subtle examples which must be included in any rewards hierarchy. Examples: thanks for a job well done, specific feedback by supervisor, workplace announcement of a victory achieved, greeting or handshake. Effective recognition links a person's or group's specific behavior with the affective domain to produce an atmosphere of pride, enthusiasm, energy, camaraderie, a sense of value regarding teams and individuals, and a pervasive feeling of self-worth for all members of the unit.

Rewards

Rewards provide the tangible element which further reinforce the positive behavior desired by senior leadership. Rewards support the positive results achieved through behavior change and a systematic recognition and rewards program allows these changes to be reinforced over a longer period of time.

Examples of traditional Air Force rewards include established decorations: AFCM, MSM, AFAM. Others include cyclical awards in a given category: volunteer, civilian, NCO, and officer of the month, quarter, or year. Functional achievement by individuals and teams is recognized in a variety of fora with rewards consisting of: certificates, dinners, trophies, plaques, mementos, medals, and badges.

The heart of a rewards system includes three principles. First, rewards and recognition do not replace a compensation system which is based on market forces. The membership of the Air Force possess core competencies and potential based on factors that are not related to the rewards and recognition program. Systemic factors which impact compensation include: recruiting targets, accession process, budgetary constraints, education levels required, professional training offered, opportunity for promotion, and pay and allowance limits. Second, a rewards and recognition system must include the full spectrum of rewards and recognition to include those that would be considered traditional and those which would require innovation on the part of the Air Force and its people. Third, emphasis must be placed on the "duty" of leadership to provide rewards and recognition. Leaders recognize their traditional role in recognition ceremonies. Leaders take seriously their role in grooming their subordinates for promotion. Fully integrated systems of rewards and recognition include the second and third principle: full spectrum of rewards and leadership duty.

The Full Spectrum, the Innovative Approach

Starting with the end in mind suggests that certain deliverables will be part of a rewards and recognition system. These are represented in a fully integrated hierarchy.
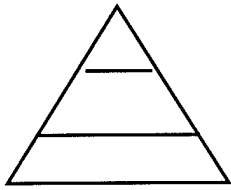
Top tier: national and organizational
Middle tier: team
Bottom tier: individual and traditional

A fully integrated system of rewards and recognition at the installation will be mission-focused, customer focused, and will meet the objectives of the unit leadership. Additionally, the rewards and recognition system will integrate the second and third principles mentioned above: the full spectrum of rewards and recognition to include those that would be considered traditional and those which would require innovation to adopt, and , emphasis placed on leadership duty to provide rewards and recognition. Leaders recognize their traditional role in recognition ceremonies. Leaders take seriously their role in grooming their subordinates for promotion. Fully integrated systems of rewards and recognition include the second and third principle: full spectrum of rewards and leadership duty.

Rewards and Recognition, the Full Spectrum

In order to present a fully integrated methodology for rewards and recognition it is imperative that the full array of recognition types be captured and later integrated. The following represents a matrix of recognition types defined by typical factors and a sample of reward options:

Factor	Peer	Functional	Traditional
Eligibility	Individuals/Teams	Any or all	Individuals
Criteria	Anecdotal	Customer input	Visibility
Nomination	Open nomination	Functional input	Director input
Selection	Ballot tally	Director level	Council level
Presentation	Informal	Commander's Call	CC's Call
Documentation	Traveling trophy	Plaque to keep	Records

| Award	Peer	Functional	Traditional
Hardware	Traveling trophy	Name on plaque	Name on plaque
	Memento	Book	Memento
Privilege	Parking spot	Parking spot	Parking spot
	1-day pass	3-day pass	3-day pass

Peer awards include individual and traditional awards found on the bottom tier, and may include team awards found on the middle tier. Functional awards may include individual and traditional awards for functional expertise (bottom tier), team awards for a functional (cross-functional) effort (middle tier), or an organizational award (top tier).

The success of a fully integrated rewards and recognition system relies on several key elements. First the spectrum of rewards and recognition are evident and valid within the respective culture. The introduction of new or even contentious reward types must be subordinated to the establishment of a systematic approach built on existing and recognized elements. Secondly, the system must support and allow for typical reward and recognition mechanisms which, rather than dismissed as "business as usual", should be considered a core element of human nature. Examples include the universal need for recognition which is meaningful to the individual and the desire of leaders to provide positive feedback to subordinates. Finally, the system must allow for subtle yet important changes in the nature of what constitutes meaningful recognition to the recipient. When designing a systems approach to rewards and recognition, the timing and significance of the reward and recognition must be considered in the hierarchy of individual and traditional, team, and organizational.

Individual and Traditional Awards: the Bottom Tier

The integration of individual and traditional awards must be preceded by a question: Are individual awards appropriate in a Quality Air Force culture? This closely resembles the question: Can an individual process improvement effort be considered part of a Quality Air Force initiative? I would suggest that although Quality Air Force brings a heightened awareness of the value of teams, there will be opportunities to improve organizations through individual initiative. The real question regarding individual rewards and recognition is: In a quality culture should leaders be afforded the opportunity to reinforce the positive behaviors of individuals? The answer to this question most assuredly is "yes".

This being the case, I suggest that the principle factors governing individual and traditional rewards and recognition are timing and significance. It may be suggested that mementos such as commemorative coins and certificates presented by senior leaders for team-based success are the stuff of Quality Air Force rewards and recognition. These certainly have their place in the bottom tier of the hierarchy, but they share this position with a number of other forms of recognition. Also on the bottom tier is most basic form of recognition: the personal thanks of a supervisor or respected leader for a specific job well done. Although the military culture teaches workers to perform without the expectation of thanks, it is the duty of the leaders to reinforce positive behaviors on the part of subordinates. To this end, nothing substitutes for an appropriate word of thanks. Shifting the focus to the provider of rewards and recognition, a systems approach will allow leaders the opportunity to achieve their objective of grooming subordinates for promotion. In addressing this leadership requirement it is vital that we identify rewards and recognition timing as the key factor in grooming subordinates for promotion. The question is not should the leader recognize each subordinate, but when should each subordinate be recognized for maximum value for the promotion process. It is reasonable to expect that each member will be recognized and rewarded at some time in his or her tenure with the organization, the only variable is when. Many individual and traditional awards are highly predictable. Leaders can identify nominees for these recognition categories well in advance using the matrix shown.
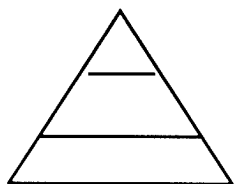
Top tier: national and organizational
Middle tier: team
Bottom tier: individual and traditional

Traditional Awards Eligibility Listing

Period	Airman	NCO	SNCO	Civilian	CGO	Special
CY97						
Q1	(names masked for confidentiality)					
Q2						
Q3						
Q4						
Annual						
CY98						
Q1						
Q2						
Q3						
Q4						
Annual						
CY99						
Q1						
Q2						
Q3						
Q4						
Annual						

Leaders can keep a confidential list of organizational members, when they plan to recognize them, and the timing of that recognition. The matrix will serve as a historical document of who was recognized when, will facilitate the planning of current and future recognition, and will make the rewards and recognition process less arbitrary.

Traditional end-of-tour decorations can be awarded based on local or headquarters policy, limiting the arbitrary determination of who gets what, and allowing the member to choose the most meaningful venue for receipt of the decoration (losing unit or gaining unit). Peer recognition, letters of appreciation, and tokens of achievement are integrated into the bottom tier.

Team Awards: the Middle Tier

Innovation in the rewards and recognition process will find its center of gravity in the middle tier. Air Force Space Command has designed its approach from the top down. Starting with the crowning jewel, the Chief of Staff Team Quality Award, Space Command submits
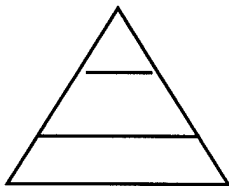
Top tier: national and organizational
Middle tier: team
Bottom tier: individual and traditional

its two most competitive initiatives annually for this competition. These nominees are selected from the wing nominations for the annual Space Command Team Quality Award. This level of involvement is consistent with command emphasis to be "competition tough" and the perspective that winners are those who are "in the arena" and not merely spectators. Additionally, each wing promotes the achievement of a team-based initiative in the command's quarterly Cross-tell program. Finally, headquarters teams compete for a separate category of team awards. It is important to note that the criteria for team recognition is consistent with that of the Chief of Staff Team Quality Award.

Informal team recognition is demonstrated during the semi-annual Commanders' Conference. In this forum, wing commanders present a team-based improvement of a team chartered by the Quality Council. The criteria used is consistent with that of the Chief of Staff Team Quality Award. Wing commanders present the improvement in the seven-step process improvement sequence using storyboard elements converted to overhead slides.

The command's recognition of team-based improvement also integrates the Air Force Suggestion Program. Consistent with Air Force policy, team members are encouraged to submit team suggestions where appropriate. Team members share in the monetary and non-monetary recognition provided by this program. Although the Suggestion Program falls outside of the functional area of Quality Improvement in Space Command, it is important to integrate this vehicle into the overall command system of rewards and recognition.

Organizational Awards: the Top Tier

Innovation at the organizational level integrates the Malcolm Baldrige National Quality Award criteria into the recognition of outstanding performance. A fully integrated rewards and recognition system will combine leadership (Category 1) and the human element (Category 4). Specifically, Leadership System and Organization (1.2) will be balanced with High Performance Work Systems (4.2).

Space command has incorporated two such vehicles into the top tier. Both are based on the Malcolm Baldrige National Quality Award Criteria.

The first is the Secretary of the Air Force Unit Quality Award. Space Command units are familiar with the application of the criteria with a requirement to accomplish an annual Unit Self Assessment based on the same. With this level of expertise, each wing submits a nomination package for the Secretary of the Air Force Unit Quality Award.
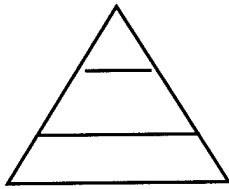
Top tier: national and organizational
Middle tier: team
Bottom tier: individual and traditional

The second vehicle requires a break with popular tradition to fully appreciate. Intuitively we all know that recognition and reward in the true sense drives behavior, and nothing like a visit from the Inspector General engages the hearts and minds of the people. With few exceptions the energy and enthusiasm displayed following a successful visit is unmatched. Space Command has integrated the Quality Air Force Assessment (QAFA) process into the rewards and recognition system by combining the need for compliance with the Baldrige criteria challenge to strive toward exceptional performance. In order to establish a baseline of "Satisfactory" the organization must achieve full compliance on items clearly specified in the Space Inspection Guides. These Guides are developed in concert with the functional areas and establish the acceptable level of regulatory compliance and constitute the Functional Assessment (FA) portion of the QAFA. It is important to note that these compliance items are clearly evident to both inspector and organizational leadership. The challenge to excellence is offered by the Quality Assessment (QA) portion. During this phase, the unit competes against a world-class standard, not another organization.

The ultimate challenge for organizations is to move from a stimulus-response form of rewards and recognition to a systems approach of establishing internal goals and objectives, achieving them, and setting goals and objectives that are higher still.

Conclusion

As organizations become more sophisticated with, and leaders become more comfortable applying the principles of quality, several changes can be anticipated: leaders and supervisors will not recognize and reward members because the members require this to do their duty. Rather, leaders and supervisors will recognize and reward members because it is the leader's duty to reinforce positive behavior in the workplace. The potential of team-based improvements will be understood and fully developed. Organizations will develop the sophistication to set and achieve goals and objectives that are consistent with its values and drive organizational improvement.

Quality Approach — The Right Start For A USA

Col David J. Boyles

Col Boyles is the Quality Advisor for the Air Force Development Test Center. The colonel graduated from the Air Force Academy in 1970 and has an MS from the Air Force Institute of Technology. He has served as a navigator in the F-4 Phantom as well as a logistician in aircraft maintenance and supply. He has commanded a logistics group as well as four squadrons during his 26 year Air Force career.

Quality Approach — The Right Start For A USA

Col David J. Boyles
AF Development Test Center

Abstract

Unit Self Assessments, based on the Quality Air Force criteria, are the most powerful tool an organization can employ to introduce systematic quality processes into meeting mission requirements. In so doing, the organization begins to align its mission with proven business concepts which allow the organization to complete its assigned responsibilities better, faster, cheaper. The core values and concepts which form the foundation of the criteria are the most compelling reason to use QAF as the organizational model for excellence. These values are the characteristics which comprise the best in organizational excellence; the criteria will drive the organization in this pursuit.

The greatest mistake an organization can make in undertaking this USA process is failing to articulate and document the Quality approach or strategy at the senior executive level. Frequently, leaders leave this task to subordinates, quality advisors, or consultants. Disaster is usually the outcome of this misguided approach. Only senior leaders have the understanding and, more importantly, perspective, to build the organization's Approach. The job of the USA team is to take the leaders' approach and evaluate it for deployment and results.

> Hypothesis: *Excellent organizations recognize that the Quality Approach is the sole prerogative and, more importantly, responsibility of senior leadership. This task cannot be delegated.*

The Malcolm Baldrige National Quality Award criteria was first developed in 1987 as a result of Public Law 100-107. Since that initial approach, the criteria has continued to change and evolve as emphasis changes and we understand more of what it takes to build superior, quality-based organizations. Throughout this evolution, one constant thread has been the tri-themes of approach, deployment, and results. Approach is the strategy that the organization employs; deployment is how well this strategy is integrated into the organizational framework; and results are the outcomes we expect from well deployed, on-target strategies.

Baldrige Criteria

The Air Force Quality Council adopted the Malcolm Baldrige criteria as the basis for Quality Air Force in 1992. Quality Air Force Assessments (QAFA) followed shortly thereafter to objectively measure the Quality progress of an organization. Unit Self Assessments (USA) became the vehicle for an organization to measure its' progress against an objective set of criteria, identify gaps in approach or deployment, and address those gaps. It is interesting to note that the USA process provides a way to not only measure and reward accomplishment, but also to identify areas for improvement that need to be addressed. This can only happen with objective, proven criteria.

The criteria consists of five levels of indenture, each being more specific than its' successor. The first level of indenture, at a broad level of understanding, is the category. Table 1 depicts the seven categories which comprise the Baldrige criteria and the equivalent for QAF, sometimes known as "Blue Baldrige."

Category	Baldrige Title	QAF Title
1.0	Leadership	same
2.0	Information and Analysis	same
3.0	Strategic Planning	same
4.0	Human Resource Development and Management	same
5.0	Process Management	same
6.0	Business Results	Performance Results
7.0	Customer Focus and Satisfaction	same

Table 1: Baldrige Categories

Subordinate levels of indenture to categories are items, areas, subareas, and notes for explanation(see Table 2). Approach and deployment information is called for in nearly every item (19 of 24) and area identified by the criteria (note: the five items that do not call for approach and deployment data require results only).

Level of Indenture	Name	Number
1	Category	7
2	Item	24
3	Area	54
4	Subarea	multiple
5	Note	multiple

Table 2: Baldrige Criteria Structure

It is important to think of this criteria as a set of questions that an organization would ask of itself. The answers to these questions and their deployment throughout the organization represent superior business practices, and world class results routinely are the product of this process.

It is not uncommon to say that the Quality Air Force represents our basic leadership and management style. It is interesting to examine why this is true. Table 3 lists the core values and concepts which the criteria is based on. These values form the core themes which are repeated throughout the criteria. Simply put, these values represent the tenants of a superior organization. This is the type of organization we want to be part of. QAF drives our efforts in pursuit of a model organization which reflects these values.

Customer-Driven Quality
Leadership
Continuous-Improvement and Learning
Employee Participation and Development
Fast Response
Design Quality and Prevention
Long-Range View of the Future
Management by Fact
Partnership Development
Corporate Responsibility and Citizenship
Results Orientation

Table 3: Core Values and Concepts

Approach is the Foundation

The initiation of this process is to build the approach, and there is one, and only one, group that either can or should develop the approach — senior leadership. The key to an organization's quality journey and the principal theme of this paper is that senior leadership must initiate the USA process by articulating and documenting the Quality Approach. This responsibility cannot be delegated to any lower echelon. This assertion is logical when one thinks about this argument: the approach for an integrated Quality system linked to mission accomplishment represents an organization's basic leadership and management style. Only senior leadership can develop the guidelines which define this style.

First, the approach must be articulated. Senior leadership, often an executive council or corporate board, must come to consensus on the details and programs which comprise the organization's approach. Because the questions contained in the criteria are tough, this is not an easy process. The senior leadership is on thin ice when they assume that an undocumented approach is known and understood by the entire workforce. What frequently results from this assumption is confusion and a hazy approach which is open to a variety of

interpretations. Second, this approach must be written. The good news is that the resulting document is enduring — except for enhancements and new programs, the approach remains constant. The bad news is that this is often a difficult document for management to write, but absolutely necessary. Only by going through the time and trouble of this documentation will management begin to come to grips with their own understanding and the simplification necessary to explain it throughout the entire organization. The latter is key to effective deployment.

There is an insidious trap that organizations frequently fall for. Because the criteria is difficult to understand and tougher to answer, leadership frequently delegates (sluff off) the task to their quality advisor or an outside consultant. Disaster invariably will result. To repeat, only senior leadership is equipped or authorized to describe the organization's basic leadership and management style. Only senior leadership has the credibility, among themselves and their stakeholders, required for this task.

The approach should be explained at the top four levels of indenture (see Table 2). This degree of specificity is necessary to really implement programs which satisfy the demands of the criteria and introduce Quality-based systems to meeting mission or business requirements. Initially, this may seem like an onerous chore. An acceptable technique for a small organization in the first year of their quality journey is to only identify the approach down through the area level (3), provided they are committed in the next cycle to further identify the approach at the subarea level (4).

It is extremely important for the leader to fix in his or her mind the proper balance between mission and quality. The mission is the reason the organization exists. Quality represents our basic leadership and management style. It is merely the means to accomplish the mission better, faster, cheaper than ever before, in the spirit of continuous improvement. QAF should never be treated as a stand alone or separate program; if so, it will surely fail as has been the case with nearly three-quarters of the Quality efforts begun in organizations nation-wide. Only when Quality is integrated into the framework of mission accomplishment will the organization begin to see the success it expects.

Unit Self Assessment

Now that the approach has been identified, it is appropriate to assess where the organization stands. You might be tempted to assume the answer is 'ground zero,' but that would be naive. In fact, organizations typically have been doing a number of things right over the years which nicely fit into the QAF framework. Quality is not a radically new concept of management as some might lead you to believe. Rather, it is the culmination of an evolutionary process, packaged in a scientific method. Additionally, the Quality approach defined by the Baldrige criteria is both comprehensive and systematic. So the baseline assessment is important to understand where the organization stands against the newly established approach.

The process of establishing this baseline is commonly referred to as a unit self assessment, and this is where organizations frequently make a critical mistake. They assume that the objective of the USA is to determine approach, deployment, and results. By making this mistake, senior leadership is, in essence, asking the USA team to identify the approach. This is not the team's job; rather, as stated earlier, it is the primary responsibility of the leadership team. By failing to articulate the approach, leadership has given the USA team an impossible task. The first hint of the resulting disaster occurs when the team outbriefs their findings and identifies multiple approaches, anecdotal evidence, and a report with low credibility. It is an interesting paradox that the lack of senior leadership involvement in approach development is the primary reason for a USA to lack credibility. In essence, senior leaders, who are quickest to fault the USA process, are, in fact, laying the blame at their own doorstep.

In fact, the objective of the USA should be to take the documented approach and canvas the organization for evidence of deployment and results. The team could also identify missing or poor strategies for the leadership group to revisit, but most of their work will concentrate on how well the approach is deployed and the maturity of that deployment measured by results. This information, coupled with a solid approach and the understanding gained through its' development, should prove very valuable to management in identifying and closing gaps in the organization's QAF structure.

Figure 1 depicts the relationship between approach, deployment and results. Approach is the responsibility of leadership to articulate. The approach is manifested throughout the organization by alignment of the leadership system, achieving what Deming referred to as "constancy of purpose." This occurs during the deployment phase when ownership of the approach becomes organization-wide. Finally, results bubble up from the organization as the result of an on-target approach which is well deployed in the organization. Results are merely the maturity of systematic processes.
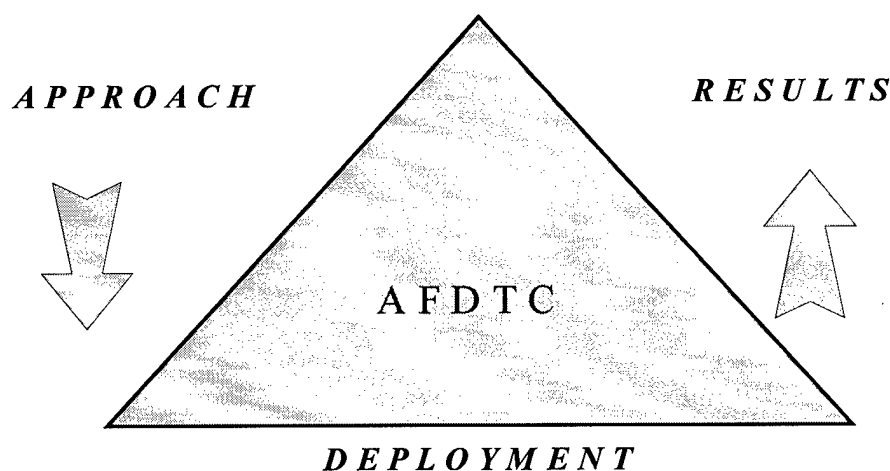
Figure 1: ADR Relationship to the Organization

In essence, the approach gives the team a framework or roadmap of how answers to the QAF criteria lead to mission accomplishment. The importance of this cannot be overstated. It is frequently said that, for senior leadership to commission a USA without first document-ing the approach personally, is analogous to sending a team on a treasure hunt with no map nor description of the treasure. The result of such a misguided treasure hunt would be sheer folly. Put another way, one USA team reported during the outbrief to their Corporate Board, "you told us to go out and grade the homework, but you forgot to tell us what the assignment was."

Uses for the Quality Approach

There are several important uses for this Quality Approach. Certainly, the one already stated — using the approach as the initiation point for a USA — is a prime example. But others in the organization besides the USA team can benefit from this document. The approach may be viewed in the same manner as a football team's playbook. At the start of practice, the coaching staff delivers a playbook to everyone on the team. Deployment occurs as practice ensues and the plays are memorized, rehearsed, and honed. The results are why we play the games. Organizations need playbooks just like football teams do. How else do we expect the players to understand which play has been called and their part in executing the play?

But there are still more uses for the approach. The document can be used to introduce visitors and newly assigned key personnel to how the organization manages its' business. When a new senior leader is assigned, the approach is an excellent introductory document for the senior executive. If the new boss wants to make changes to the approach, what better way to initiate the process than by showing him a concise document of how it is done today. The new leader will appreciate the organization making his job easier, and we will be able to make the shift in strategy sooner as a result of this streamlined process.

Update of the approach is certainly expected, in the spirit of continuous improvement. Once the Executive Council has documented the approach, it is appropriate to reexamine the approach, probably during an annual planning cycle, with the gaps which our USA has uncovered. Although the approach is enduring, the organization would expect it to mature and improve as we learn more about quality systems and measure their relative success in our organization.

Conclusion

Joseph Juran tells us that the best definition we have of Quality in an organization today is contained in the Malcolm Baldrige National Quality Award criteria. The criteria is tough, but it is comprehensive — all of the factors we believe make a superior organization, embodied in the core values and concepts, are called for in the criteria. Senior leadership is not only responsible for building the approach; in fact, only they are capable of accomplishing this.

One of the common complaints levied against Quality in an organization is that the leaders do not "walk the talk." If leadership takes it upon themselves to identify the approach for their organization called for by the criteria, the role of leadership with respect to Quality will become apparent, to both the leaders and their people. In fact, we can clear up many misconceptions if we just define leadership and approach as synonymous terms.

Sources

1. Air Force Development Test Center Executive Council, Eglin AFB, FL, 25 July 1995.

2. Air Force Flight Test Center Unit Self Assessment, Edwards AFB, CA, 15 July 1994.

3. Air Force Instruction 90-501, Criteria for Air Force Assessments, HQ AF/PEQ. Washington, D.C., Draft.

4. Boyles, David J., Colonel, "When Good Enough Isn't: Quality Air Force In Your Organization," *Air Force Journal of Logistics*, Gunter AFS, AL: Air Force Logistics Management Agency, Spring-Summer 1994, pp. 1-5.

5. Cranston, Stewart E, Maj Gen, speech to AFQI Quality Advisors Course, Eglin AFB, FL, 8 Jan 96.

6. Juran, Joseph, Last Word Tour, Juran Institute and Association of Quality Professionals, City of Industry, CA, 1 October 1994.

7. Malcolm Baldrige National Quality Award Criteria, Department of Commerce, National Institute of Standards and Technology, Gaithersburg, MD, 1995 edition.

Systems Telecommunications Engineering Management (STEM) Database (DB) Management

Development and Implementation of the STEM Database

Mrs. Denise S. Hay

Mrs. Denise Hay is currently assigned as an Air Traffic and Control Landing Systems (ATCALS) Program Manager at the 38 Engineering Installation Wing (EIW), Tinker AFB, OK. Prior to that, she was assigned to the Systems Telecommunication and Engineering Management (STEM) Directorate as the Database Manager. She also served as an advisor on the Commander's Quality Board. She has a MS in Management Sciences and is a member of Who's Who in Professional Management.

Systems Telecommunications Engineering Management (STEM) Database (DB) Management

Development and Implementation of the STEM Database

Mrs. Denise S. Hay

38 Engineering Installation Wing (38 EIW/EST)

Abstract

Systems Telecommunications Engineering Management (STEM) was implemented in November 1990, with a mission to "integrate Air Force Communications Information Transport System C4I Planning and Execution". This is a factual account of how they developed and implemented their database. This account also provides some of their lessons learned and how they incorporated them into their process, and the steps they took to ensure they would not reoccur. Even though members of the STEM Directorate are tenured managers, engineers, program managers and administrators, what follows proved that in a continually evolving technical environment processes and personnel must be flexible to change and integration of the team concept is by far the concept to implement.

The STEM Directorate was established to serve as the single point to the customer for processing requirements and developing blueprints for Air Force bases and Commands. The central purpose of the blueprints is to design and implement standard base architecture throughout the Air Force. This one element, standard base architecture, will do more to position the Air Force as a leader in technology and prove them ready for the 21st Century. The blueprint is also invaluable to the Air Force as it identifies existing infrastructure and allows for projecting future requirements. It provides the capability to identify current Command, Control, Communications, Computer and Intelligence (C4I) programs and plan for future programs. The blueprint provides the customer with interoperability issues and recommended solutions well enough in advance for issue resolution. The blueprint also estimates cost down to the element level and provides the customer the functionality to group projects based on need, availability of funds and time to complete the project. With the inclusion of funding data, the customer also has a document that is accepted for use in the projecting and planning for future dollars.

In July 1992, Air Staff directed the STEM Directorate to find a way to implement the Blueprint. Until implementation of the Blueprint, preparation of communications plans, program management directives and such were used to track communications requirements and installations on a base.

188

From the beginning, STEM management determined that a process must be established to guide and standardize development of blueprints. Blueprints are living documents and that was a large factor in process development.

A Blueprint Process Working Group was chartered to design the process for Blueprint development. The first effort of the team was to establish a frame work for the process and a timeline for completion of the working group efforts. With this in mind, they listed the steps in the BP process and estimated the time required per step. From their research and development the following process was implemented.

THE PROCESS IAW ESOI 33-1
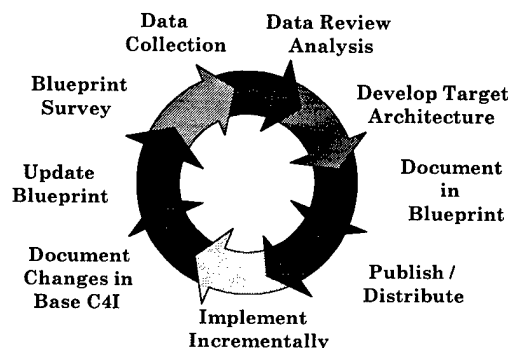
Figure 1. Blueprint Process

With the process established and implemented within STEM, a schedule for Blueprint production was established—one Blueprint Revision and three page changes per year.

By early January 1995, bases provided a blueprint product by STEM had increased more than the personnel available to support the process. During the same time content required in the Blueprint had significantly increased. Further added to the products provided by STEM were broadgauge E&I costings, base computer surveys, network consultations, tracking the blueprint process, Blueprint Implementation Directive (BPID) preparation and tracking, and capturing data for report generation to enhance management planning and support 38 EIW and higher command strategic planning.

With the blueprint process well underway the need to track and report progress became of great importance within the STEM Directorate as well as the 38 EIW. STEM management began to receive command level inquires on issues such as the number of blueprints accomplished to date, the number scheduled per quarter, current status of the blueprint and customer satisfaction level. The need to provide immediate response to these types of questions and the need to provide the directorate with the method to better schedule blueprint support, an internal blueprint tracking function was established.

189

STEM CUSTOMER FEEDBACK
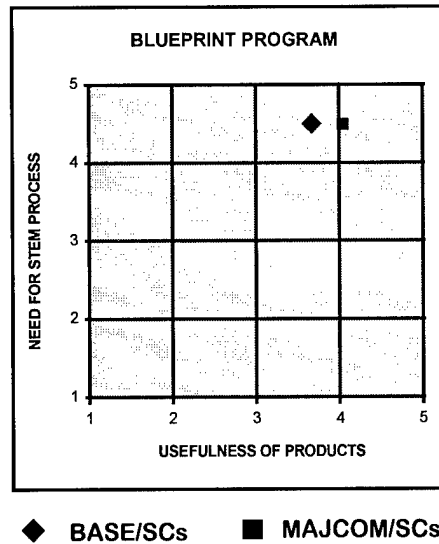
Figure 2. STEM Customer Feedback

Knowing the need existed to provide status reports on blueprint status, STEM management determined that the need existed to establish an internal mechanism for blueprint reporting. After careful research and study of known databases and databases currently in use within the 38 EIW, a decision was made to design, develop and implement a STEM Database in Microsoft Access. This database was to track blueprint milestones and provide management the capability to manipulate data and generate various reports. With this is mind as the known requirement, personnel initiated the development 15 January 1995. The initial release of the STEM Database was mid-February 1995. This initial design consisted of 15 tables and 10 milestones. To date the database has expanded to 100+ tables and 50+ fields. This expansion has provided users the capability to track, manage and generate charts and reports. Data contained in the database includes but is not limited to "Date Received in STEM", "Date to STEM B", "Date Returned to Customer", "Blueprint Revision Date", a multitude of Blueprint Phase Dates, and various cost related fields.

Shortly after the February 1995 implementation of the STEM Database, additional tasks were assigned to the STEM Directorate increasing the tracking and reporting requirements. The result: modifications to the STEM Database. Over the next few months the above scenario was repeated several times. The result: modifications to the STEM Database. During this same time frame another process was being defined and developed. The process was 38 EIW Metrics. A standard presentation format to enable the wing to track, capture, manipulate and present workload statistics. Upon review of STEM's requirement it was determined that not all required milestones were identified in the database. The result: modifications to the STEM Database. Shortly after the development and integration of metrics to the STEM Database, came an additional requirement that the metrics must contain necessary data and statements to tie them to the 38 EIW Strategic Plan. The result:

design and inclusion of additional charts, modifications to existing charts and the addition of metrics statements to the presentation side of metrics. A total of 24 metrics charts are available for inclusion in the STEM Metrics Briefing or other briefings as required.

Blueprint Revision Schedule
(Supports Goal 2, Objective 2.1)

Legend: ORIGINAL, ACTUAL, PROJECTED

Goal = Revise All Blueprints by 1 Oct 96
Metric 2.1 Blueprint Revision Schedule
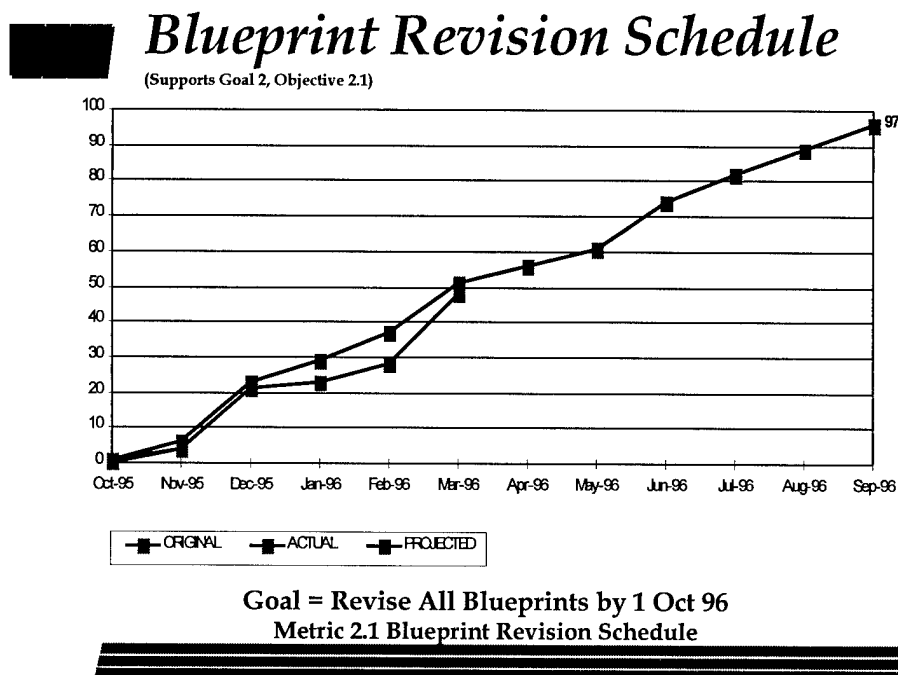
Figure 3. Blueprint Revision Schedule

Blueprint Revisions Completed By MAJCOM
(Supports Goal 2, Objective 2.2)

MAJCOM	Value
ACC	7/21
AETC	3/13
AFMC	3/13
AFRES	3/11
AFSPC	2/11
AMC	4/10
PACAF	3/9
USAFE	2/6
OTHER	1/3
AF WIDE	28/97

1 Oct 95　　1 Jan 96　　1 Apr 96　　1 Jul 96　　30 Sep 96

Goal = Achieve and Maintain a Total Review and Update Process of 25%
of All Published Blueprints Each Quarter
Metric 2.2 STEM Blueprint & Page Changes
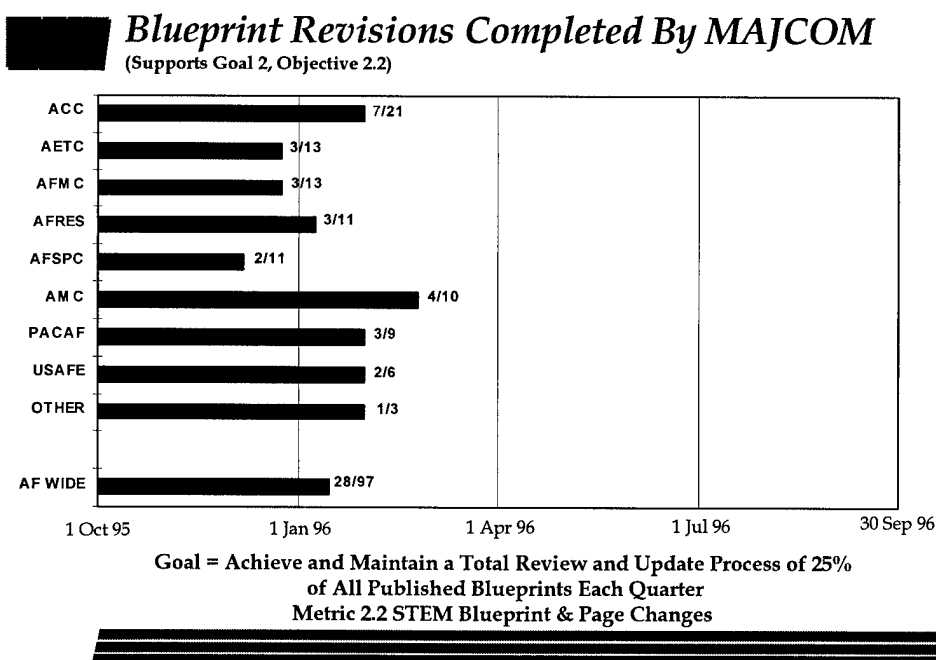
Figure 4. Blueprint Revisions Completed By MAJCOM

191

Page Changes Completed By MAJCOM
(Supports Goal 2, Objective 2.2)

	1Q96	2Q96	3Q96	4Q96
ACC (21)	8/15	11/15		
AETC (13)	10/10	9/9		
AFMC (13)	4/9	6/10		
AFRES (11)	8/9	8/8		
AFSPC (12)	5/10	6/9		
AMC (10)	7/7	7/7		
PACAF (9)	7/7	7/7		
USAFE (6)	4/4	4/4		
OTHER (3)	1/2	2/2		
AF WIDE (98)	54/73	60/71		
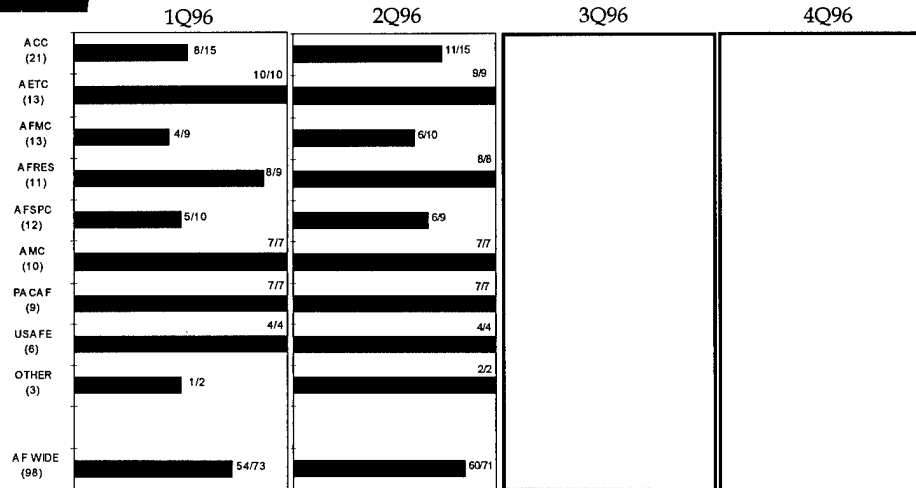
Goal = Achieve and Maintain a Total Review and Update Process of 25%
of All Published Blueprints Each Quarter
Metric 2.2 STEM Blueprint & Page Changes

Figure 5. Page Changes Completed By MAJCOM

STEM Costing Progress
(Supports Goal 3, Objective 3.2)

Legend: ON TIME, 31-60, 61-90, 91+, LATE, ON TIME, LATE
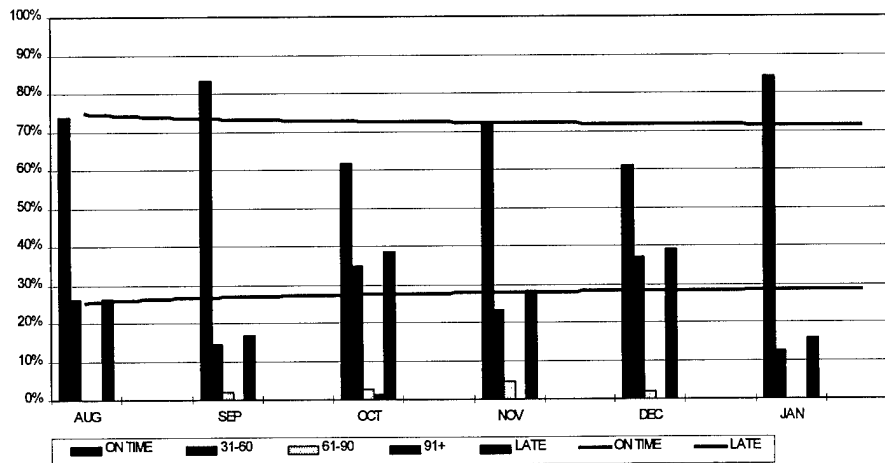
Goal = Achieve 30 Day Turn-Around In 90% Of Costings By End Of FY 96
Metric 3.2 STEM Costing Timelines

Figure 6. Stem Costing Progress

In conjunction with the metrics requirements on the STEM Database, the expanding tasks within STEM, the time in which to complete blueprints and requirements processing and limited personnel, a STEM Working Group was formed to make recommendation(s) on how to better service the customer. The recommendation of the working group was to automate the blueprint process to include distribution. In order to support this recommendation the STEM DB would have to expand and capture additional data and provide interface capability to enable automated data entry. Data Automation personnel are members of this working group and provide direct support on development of the interface(s) required to integrate automation of blueprint tracking side of this development.

The impact to the STEM Database would be quite significant and in order to accomplish the many demands placed on the database more personnel would need to be assigned to support these demands. However, these people would need to have a technical background and be knowledgeable of Microsoft Office Professional which includes Microsoft Access. With research completed on expansion of the STEM Database and inquiries made for additional support personnel, it was determined that additional personnel would not be available in the near future.

At this point it became evident to database personnel that consistency of mission and continuity of work efforts must be established in order to accomplish tasks assigned to personnel within the automation function. This fact along with other supporting statements were submitted to STEM management and it became evident that the automation function is a pivotal component within STEM; a valid function justifying a need to develop and implement its own process and mission. In June 1995, a team leader was assigned to the STEM DB function and automation personnel were directed to define their mission and develop their process.

The team leader brought the team together. At this point the team discussed what they had been and were currently assigned. It was evident to the team leader that automation support personnel were becoming overwhelmed with the number of taskings and the time necessary to complete them. Members advised the team leader that they were constantly being assigned tasks from all directions within the STEM Directorate. Everyone needed their task completed immediately. Often times when the task was completed and returned to the requester, the requester returned to automation asking that a change or two be made as it was not quite what they needed. Upon investigation, it was determined that the task had not been clearly defined by the requester. The daily duties performed by automation personnel such as software installations, debugging of existing software, suspenses, and meetings added to time away from application development and documentation. However, large scale taskings for development continued to roll into the automation function. The most obvious conclusion was the team could not work any harder—they were at peak performance—they had to work smarter. The only thing to do was develop a process to give consistency and continuity of purpose to the automation function. This provided the automation personnel what they needed to state their mission. The mission of the Automation Function is to develop databases and applications to support the requirements of the STEM Directorate.

With the above in mind, the automation team begin to discuss their needs and research what other automation functions had implemented to smooth out their process. After some time, members agreed that the automation process would be as follows: (1) submission of an approved tasking for automation support. This tasking must be clearly defined and include the required completion date. (2) automation will review the task for compatibility to existing system, estimate the skill required to complete, estimate hours to complete, etc. (3) automation reviews current schedule of internal and external tasks to determine if requirements of the new tasking can be met. If yes, the task will included in the schedule, a developer and program assistant will be assigned and the requester will be notified. If no, the team leader will meet with the requester to see if there is a way the task can be modified for automation accomplishment. If not, it will be returned to the requester will all review comments attached, i.e. the date the automation function would begin and finish the task and alternate options, if any, for outside accomplishment.. (4) Automation Team reviews the schedule weekly to ensure that problems are identified early on and the customer is being satisfied. (5) Establish a Configuration Control Board. (6) Test the STEM DB on a regular basis to ensure that it is well, identify enhancements well enough in advance to enable timely resolution. (7) The Automation function reviews and modifies the "process" as necessary to provide the best automation support possible with the personnel and tools available.

With the process in place, the Automation Team determined that their next step would be to test the STEM DB. It was already evident that existing hardware was being utilized at the maximum limit and soon system failures would occur. Also, with ongoing developments and future developments identified, it was time to model data, analyze the findings and establish a plan to implement enhancements and additions.

The current automation personnel advised STEM management that data modeling would be necessary to determine the existing load on the database, estimate the future load created with the expansion of the database and identify hardware/software requirements to support the function. This process was accomplished over several months due to situations encountered such as the furlough in November and higher priority automation assignments that drew all support staff from the modeling of data. Once the modeling was complete, automation personnel advised management of new or additional hardware and software requirements necessary to support the demands placed on the STEM Database. (At this point the STEM DB was in excess of 100 tables and 50 milestones.)

Currently, automation support personnel are completing their review of the data modeling task. Information gained from the modeling will be defined and portrayed in a strategic plan for implementation. This strategic plan will be divided into phases and elements for implementation. This plan will provide STEM Automation the capability to enhance existing applications and develop new applications concurrently with implementation of the STEM Automation Strategic Plan.

With the implementation of the new process continuity with the team was beginning to form. Tasks were being reviewed and scheduled in a consistent manner. The team could see that while their tasks were technical and complex in nature, they were beginning to work SMARTER instead of HARDER. Some of the stress still existed, but it was understood that with this type of work comes a certain level of stress. The automation team was also of the opinion that as the hardware and software is upgraded and additional qualified personnel are added to the team, more tasks can be accomplished in a timely manner. Thus, greater support for the workforce and a reduction in the level of stress felt by the automation team.

What became evident was the fact that when a need is identified in an organization, it must be completely defined. It must also be assigned a priority within the organization. Further, management must pledge the necessary resources in order to meet the need. What STEM did experience with the development and implementation of the STEM Database were growth pains. Once the development was started and personnel became familiar with its capabilities, the demand was greater that the resources available to develop and implement. That coupled with reductions-in-force, furloughs and internal non-availability of personnel limited the development and implementations that could be accomplished. The STEM DB (Automation) function was established with one person and a task to develop a database. However, STEM management has submitted position descriptions for additional automation personnel and supports the automation process and continued development and implementation of the STEM Database.

Local Innovation With Deming's Fourteen Points
As A Frame Of Reference

Maj M. Elise Hereth

Maj M. Elise Hereth is currently full time Air National Guard (AGR) assigned to the Northeast Air Defense Sector in Rome, New York. She is an Air Weapons Controller and Mission Crew Commander for the Sector, as well as the Quality Advisor. She has served on active duty, as a Traditional Guardsman, and a civilian air technician, as well as AGR. She is married and has two young children.

Local Innovation With Deming's Fourteen Points As A Frame Of Reference

Maj M. Elise Hereth
Northeast Air Defense Sector

Abstract

Many Air National Guard units are an integrated part of their local communities. As a newly transitioned Guard unit located at a recently closed Air Force Base, the Northeast Air Defense Sector (NEADS) found many comparisons to local civilian companies. We began to study local Quality Award winning companies to find what they did to become so successful. Finding many similarities in our challenges, we looked for similarities in our solutions. Upon examining these companies, we saw classic text book Quality management in action— and it works. Using Edwards Deming's fourteen points as a guide to classic quality, we compared successful local companies to help us as we continue our own improvement efforts.

As the Air Force changes to a total force concept, not all units will have the same kind of support and manning as was traditionally common. Here at the Northeast Air Defense Sector (NEADS), we have transitioned to become a Guard unit as Griffiss Air Force Base was realigned/closed. This has eliminated much of our local support and infrastructure and has placed us free standing in the local community. While other units may not experience such a dramatic change as quickly, we have learned many valuable lessons that will benefit others. We need to incorporate innovative solutions to our challenges. Without this mindset, trying doing more with less will not lead to continuous improvement.

NEADS has found we have many similarities to civilian organizations in the area, and therefore, have been investigating solutions which work for them. Hiring and retaining trained personnel is a challenge for any organization, regardless of their product or service. It becomes more challenging in an area with severe winter weather and a depressed local economy. The economy itself was influenced by the base realignment, since Griffiss had been the largest employer in the county. Also, how to motivate the retained personnel to believe and participate in continuous improvement efforts is a challenge for all organizations. The local quality award is the Mohawk Valley Quality Improvement Council (MVQIC) Award. It is based on the Malcom Baldridge award, making comparisons with the Quality Air Force criteria very meaningful. This award has been available for six years and the Highest Achievement level has been presented twice. After visiting these award winners and studying their successes, we have seen classic text book quality in action. For a definition of classic quality, I will refer to W. Edwards Deming's 14 points. Looking at each

point, I will elaborate on what we observed and how it applies to our Air National Guard unit. The following companies won the prestigious Highest Achievement Award from the MVQIC: Sturges Manufacturing Company, and Tri-State Industrial Laundries. St. Elizabeth's Hospital won the High Potential level of the award. I will also mention Oneida Limited (Ltd.), the manufacturer of Oneida silver which is exported world-wide and is located in this county.

1. **Create constancy of purpose for improvement of product and service**. This point includes looking at today's problems, tomorrow's problems, and seeking innovation at all levels. At Sturges manufacturing and Tri-State, they have instituted very active customer surveys to identify current problems and future concerns. They also have several types of suggestion programs allowing workers to by-pass supervisors if they want to. NEADS uses a Quality Improvement Proposal (QIP) program which will consider anonymous, as well as suggestions which have by-passed supervisors, ensuring ideas don't stop close to the source. For customer satisfaction, we more closely resemble Tri-State since they are service oriented. The challenge here is to ask the customer (in our case, this is often the pilots we provide control) detailed questions to force a response that is usable and yet not so detailed that the customer will not bother to respond. A very short, detailed survey works best after the organization decides what is really important to know from the customer. Of course, any additional feed-back is always welcome. Innovation is needed to combat new situations which were not common for Sectors in the past. To establish this constancy of purpose for the organization, "innovation, research and education, continuous improvement of product and service, and maintenance..." are needed (Walton p 56).

2. **Adopt a new philosophy.** Sturges is more than one hundred years old and had been going along with traditional American management unchallenged until six years ago. Philosophy changed as the old managers retired. The new manager realized changes needed to be made to remain competitive in what had become a world-market. They manufacture straps and webbing and needed corporate customers to continue to make a profit. These customers could go anywhere with their business. Tri-State also has to attract customers from outside the local area. To do this, a philosophy of 'it's good enough', and 'that's the way we've done it for fifty years' had to be updated. For NEADS, we realized an updated philosophy was needed as we transition to the Guard with limited manpower and resources and no base support. The way we always did things would not make up for these challenges. We need to continue to look for excellence and innovation beyond what we had already attained.

3. **Cease dependence on mass inspection**. If an organization waits to find the problems when they are already results, a lot of time and money have been wasted. Inspection after the fact is not the efficient way to improve processes. Sturges has a data sheet attached to each piece of machinery. The worker running that piece of equipment makes frequent checks of his/her own progress. This way, he can alert maintenance immediately that something needs attention. Waiting for an inspector would never provide the efficiency that small sampling can. This also makes quality assurance the responsibility of all members and just the QA people. Tri-State accomplishes the same thing, with the people involved in the

process the same people responsible for it. They chart details from every order and delivery to spot trends quickly. NEADS accomplishes this by having operations crews observe and critique each other for practice exercises and for the crews to look at themselves regularly to avoid training problems being identified by evaluations alone. Waiting for an evaluation or inspection is not the time to look inward for internal process problems.

4. **End the practice of awarding business on the basis of price tag alone.** Since price has no meaning without a measure of the quality being purchased (Deming p.32), we need to be careful about how we award business. The US government is notorious for being taken by rules that award business to the lowest bidder (Deming p32) . The successful local companies both look for long term supplier relationships as opposed to the 'lowest bidder' mentality. In return, their suppliers know quality will not be taken for granted and they live up to high standards. Competition should force suppliers to remain quality oriented and thus continue to spread the 'epidemic of quality'. Without base support, NEADS has been more active in determining where support is available and what control the Sector has over suppliers. For example, civil engineering support is available from other bases in the State, or by private contract. Obviously, price alone is not the only factor to consider when some agencies may appear to be available to do necessary work, but have unacceptable time delays or lack of expertise. In the long run, these constraints can make a project much more expensive. NEADS is currently addressing a problem with providing medical care for our military members. Our personnel go through the local VA for screening and then will often be sent to another military facility, or the lowest bidder. This creates problems with personnel who need surgery have to travel out of state either by med-evac or private auto. In the case of time critical procedures, this might include having an additional person drive the infirm member via private auto to a hospital far from the local area. We have to treat our personnel better than this. Prescriptions can take too long to arrive. These issues don't even address morale problems involved with going out of state away from family and friends for surgery or long hospital stays. Also, in the long run, after including travel expenses, the lowest bidder can be much more expensive than the local hospital wanted to charge in the first place. Supply relationships are complicated by the sources of the funds involved and in this sense, differ from our civilian counter-parts, however, the basis for the problem is the same. We need to look for quality and overall price instead of immediate gain in the short run.

5. **Improve constantly and forever the system of production and service.** This includes building improvements into the design stage. Continuous improvement is one of the basic tenants of Quality Air Force along with team work and customer satisfaction (or, satisfying those we serve). Crisis management is not the way to manage people or resources. Not only does it waste time and resources, but it is bad for morale and causes the workers to lose confidence in management's ability to manage. Putting out fires does not improve the process either. This merely puts the process back to where it should have been in the first place (Deming p51). True improvement takes intense study of what is currently being done. Then it requires analysis and planning. This is the classic Shewhart cycle: plan, do, study, act (AFQI p. 21). The Air Force further refined this improvement cycle: analyze, evaluate process, identify improvement opportunity, plan for the future, standardize solution, check

results, take action(AFQI p.33). This never ending cycle is used when organizations learn from their mistakes, and look for better ways to do things when there are no obvious mistakes. Sturges and Tri-State do this by constant solicitation of ideas and rewarding ideas which are implemented. Awards range from $10 gift certificates to large cash awards. For NEADS, cash , while a great motivation, is not allowed to be used, so the search was on for what will motivate improvement efforts. Primarily, it was found, improvement of the work process is a large reward in itself and personnel looked forward to being able to implement their own ideas. We also have commander's commendations and a Quality Coin which can be recommended by any member of the squadron, not just a person's supervisor or chain of command. Through studying the situation, NEADS found, as did civilian counterparts, supervisors can inhibit the reward process by not always recognizing commendable behavior, or not being proficient at writing awards. For whatever reason, individuals should not miss out on recognition and serious consideration of their ideas due to incomplete supervision. This validates suggestion programs that send the ideas directly to the top of the organization or to the team with implementation authority. This also justifies awards programs in which anyone is encouraged to nominate anyone else. This means an operations person can recognize excellence from a maintenance troop on the night shifts, when the supervisors may not be present. Besides, the operations people are actually in a great position to know which maintainers go above and beyond their duties leading to the continuous improvement we are searching for. The suggestion boxes popping up on the factory floors prove this to be true. Management, however, has to be very careful to allow implementation of ideas and to publicly present awards. The danger lies in personnel thinking the improvement efforts are eye-wash and the boss really doesn't intend to make any changes.

6. **Institute Training.** All members of the organization must know all about the organization. The managers must understand the problems that hinder the workers from completing the mission. Without proper training at the production or service level, how can we make any progress in improvements. The award winning companies stress training as important. All training, including Quality training, and team meetings is done on company time. Hourly wage earners get paid the same rate to sit in the class room. Immediately, they understand the management takes this seriously. The companies believe it will save them money and production time in the long run, and it does! Sturges found that paying employees to come in an hour early so statistical process control could be taught in-house at 6 am was worth it. When factory workers performed their own analysis on a real time basis, they knew it was time and money well spent. They also realize training is for all levels. " The first inhibitor to training is 'It's for my people, not for me.' from management." (Scherkenbach p 92). In these successful companies, the managers were the first to receive training. St. Elizabeth's hospital obtained initial quality and tools training from the NEADS Quality Improvement office. Over a year later, they still think it was time very well spent. According to their quality manager, it got everyone off to a good start. They understood the seriousness the management put on the program when they were in the classroom with Air Force personnel teaching what works in international industry. Quality training is also scheduled for shift workers and available at night, on week-end ...etc. Supervisors in the operation start out in the introductory positions regardless of rank. This way, the supervisors will understand the problems faced throughout the operation. It also provides more

flexibility for manpower and short manning situations, since people hold multiple qualifications by the time they are supervisors. It is also good for communications within the operations community since everyone can talk the same language. "The confident leader recognizes his or her need to keep growing and learning. The arrogant leader knows it all, so there's nothing else to grow toward." (Creech p 354) The same thing happens on the factory floor when supervisors understand the problems enough to authorize time and money to fix them. This reduces the adversarial relationship often existing between production workers and supervisors. (Deming p55)

7. **Adopt and institute leadership**. "The job of management is not supervision but leadership." (Deming p54) Leaders must be careful to not treat every flaw as a special case. It is important to recognize when the system is at fault and not lower the esteem or morale of the workers. Again, it helps, as mentioned in #6, if the supervisors, and leaders at all levels, understand the work being done. It is important for the leaders to look at the statistics or metrics and understand what they are actually representing. It is too easy to misrepresent the facts with creative statistics and fancy metrics. Decision making based on facts requires a fundamental understanding of the organization, the mission, goals, and how these goals are met. Gen. (ret.) Bill Creech says,"...the further I moved to the rear the harder I needed to work at staying in touch with those at the front, and keeping them the center of my attention—the stars of the overall show." The owner of the company is recognizable to the factory floor worker in the award winning companies we studied. They often appear on the factory floor. In the same way, the commander of a military organization appears in the maintenance shops and in the operation, and not just when someone is in trouble. When the boss is approachable, he has a chance of leading with knowledge and facts. "The leadership makes all the difference - always" (Creech p349) It is routine for supervisor at Sturges and Tri-State to ask a worker, "So, what exactly do you need this machine to do." This confident leadership style builds confidence throughout the work force.

8. **Drive out fear**. If the best a person can hope for is to stay out of trouble, it is doubtful many good suggestions will be forthcoming. Because workers at Sturges check their own work constantly and track their own output, the drive for excellence is internal to the employee. Employees perform quality checks to make sure the product is perfect, not to avoid getting into trouble. Their employees immediately bring problems to the attention of management or maintenance to resolve the difficulties. People working in fear will often hide problems or down play them. At Sturges and Tri-State, the teamwork atmosphere goes a far way to drive out fear. Lack of fear encourages these employees to bring up a new idea even without proof it will work. Sturges won a contract that required padded webbing which had required several steps done by hand. The factory worker had the freedom to ask management about trying a new machine technique. Management had the foresight to respond by trying the new technique and monitoring progress...not to test the employee, but to improve production. By driving out fear, in this instance, they went from a thousand straps a week to a thousand a day enabling them to fulfill the contract. Fear also encourages rumors and stunts effective communication. The factory floor is not a scary place in these successful companies. People do not fear the supervisor but work with him in a team atmosphere to accomplish the mission.

9. **Break down barriers between staff areas.** If everyone in an organization doesn't know what everyone else is doing, there will be delays and breakdowns in the processes. Also know as stove-piping, production doesn't know what supply is doing, factory management doesn't know who the customer is ...etc. For St. Elizabeth's Hospital, their first question was, "Who is the customer? Is it the doctors, the insurance company who pays the bills, or possibly the patients?" For most processes, it was determined, the doctors are the customer as they refer patients, need surgical supplies and facilities...etc. Successful companies start with every single member of the team knowing the mission. Sturges and Tri-State have their company mission statement posted liberally. They are short, concise, and simple to understand. From there, good leadership integrates all of the functions with managers talking to each other. Salesmen know the floor managers and understand procedures so they can honestly and accurately represent the company to the customer. When the engineers communicate with the production people, it is amazing what happens. A factory worker thinks up a great idea for how to do her job a lot faster, exceeding the customers requirement. She tells management who calls in the design team. Not only does the worker get her innovative design developed and put into use, but at Sturges, a US patent was awarded and other competitors will need the new machine to compete. What a great boon for team work, morale, and accomplishing the mission. Quality Improvement Teams work on implementing solutions and involve all affected areas from the beginning. This also eliminates having to go back through the levels of supervision to get buy-in for the idea. At St. Elizabeth's they recognize about forty natural work teams within departments. To handle cross functional or hospital wide problems, they have formed twenty cross-functional teams. They go out of their way to invite people to the team meetings who can make a difference and expedite the teams' implementation of improvements. They avoid the erroneous assumption that quality originates in the quality department (Crosby p. 17). Buy-in is built-in when the right people solve the problem in the first place and have the authority to put a plan into action, at least for the prototype. NEADS has staff meetings including all functions. Problems can be solved at the root level. Directorates can work together within a function or with cross-functional teams to intelligently work out problems and get solutions implemented fast. Oneida Limited is a company that exports silverware all over the world. Their annual earnings for fiscal 1995 rose 31 %. When asked how they did it, the chairman, William Matthews, said, "It has really been a team effort. Everyone here is a hero." They also created 70 new jobs during the same period (Oneida Dispatch). That is teamwork.

10. **Eliminate slogans, exhortations, and targets for the work force.** Slogans and posters talk down to the worker. How can someone increase their productivity if the system has not changed. Unattainable goals only hurt morale and destroy trust in the management. The slogans and targets coming from the management cannot have the same effect as goals the workers initiate. Sturges has teams that set their own production goals. They were told by other companies and observers it could not work since the workers would set low goals and not have the motivation to strive for higher goals. On the contrary, the workers set higher goals for themselves and achieved them. After winning their Quality Award, the workers were back at their machines before the news cameras had left. They were excited to work and took personal pride in their company's success. Instead of slogans on the walls,

announcements line the bulletin boards. They raise funds for awards and banquets with their own recycling projects. Management does not fill the bulletin boards...the workers do.

11. **Eliminate numerical quotas for the work force/Eliminate numerical goals for people in management.** Quotas do not include quality and often encourage poor quality for rewarding people for quantity. Good supervision is needed to recognize barriers to good work, not quotas and a 'piece work' mentality. Quotas also encourage poor management as people cut corners and rush to get the work done. Tri-State has a very detailed flowchart for teleservicing clients. Before the customer can complain, Tri-State has asked them if there are problems and exactly what the problem is. In today's market, speed without quality and competitive price will lead customers to the competition. They track problems to fix root causes without blaming workers or holding them to quotas. Pride in workmanship is a much better tool to ensure continued improvement than is a fear inducing quota. NEADS applies this principle by tracking evaluation trends and reporting them back to training to repair deficiencies before they occur. This should ensure quality work without the dehumanizing supervisor constantly marking down mistakes and trying to force timing criteria on every action. As Gen. Creech said about successful management, "I found their decentralized, quality-oriented approach, carried out through a team-based structure, is conceptually sound, human nature based, and highly effective." (Creech p 42) Mutual respect, and treating people well does go a far way toward continuous improvement.

12. **Remove barriers that rob people of pride of workmanship.** For anyone to take pride in his work, he must know what acceptable work is and management must know what it is. At Sturges, everyone agrees on what is quality work. The standards are clearly posted and agreed upon by workers and management. At Tri-State, they deliver industrial uniforms to other companies and track accuracy in sizes and repairs. Everyone involved from management to the worker knows the requirements and works on problems when they arise so improvement can continue. When management and workers are a team working for the good of the company and individuals, management will be less likely to purchase lower quality materials which make quality products impossible to produce. At Sturges, workers are free to discuss supply problems with management. After all, it should be obvious that buying lower quality thread will result in lower quality webbing no matter how hard the weaver works to produce good webbing. The machine operator really does take pride in producing flawless products. They gleamed with pride, "If you own a weedeater or snow mobile, you probably own some of our straps." This attitude does not come from management creating barriers and it can't be formed from quotas (#11) or slogans (#10). This is the attitude that comes from team work and pride in workmanship with clear communication and no fear. NEADS leadership is aware of potential barriers to pride in workmanship. They realize communication can be a great barrier and have gone to lengths to improve it. Since there are geographically separated areas, a LAN has been installed with e-mail, monthly bulletins are mailed, as well as encouraged use of bulletin boards, staff meetings, posting upper level staff meeting minutes for everyone, and encouraging any unit member to attend. Particularly, with a twenty-four hour operation and personnel on night shifts,

over-all motivation and attitude will make a big difference in mission accomplishment and not only meeting standards, but motivating people to try to exceed them. It also helps when there is stability with supervisors. Without new supervisors coming and going every few weeks, people can know what to expect and develop good working relationships within the shift. Also, everyone knows what the mission is and should be sure about how they will be measured. Air Defense of the United States is so important, more so than a bottom line, we must be careful to keep barriers down and encourage pride. It is more than just a job.

13. **Encourage education and self-improvement for everyone.** As competition increases in industry and the standards go up, people with motivation and education will move ahead. People who cannot read after high school will not find many places where they can keep up. The award winning companies we studied teach work related courses on company time. At NEADS, supervisors go out of their way to encourage off-duty education. This is sometimes difficult for people working rotating shifts and yet, often it is accomplished because it is considered so important. Now with classes via satellite, a whole new set of education possibilities is open to unit members, economically and efficiently. The Air Force has changed and highly educated, motivated people are the norm.

14. **Take action to accomplish the transformation.** The management in authority has to struggle with all of these points. They have to communicate pride in this philosophy and explain changes will effect everyone. A continuous improvement attitude must pervade the organization with workers knowing the management is serious. This starts with the training provided to everyone. It includes communication to all members. It includes knowledge of the processes for internal and external functions. It includes people working as a team and not just being formed up into teams by the management. The organizations studied, as well as NEADS, are all continuously working to accomplish these things. The simplified Shewhart cycle: Plan, Do , Study, Act must be applied throughout the organization(AFQI p 55). Flowcharts and COPIS (Customer Output Input Supplier) or the equivalent will ensure everyone knows what direction the organization is going. These tools, along with a strong mission and plan help the members of the organization, as well as those it serves, and suppliers. When everyone understands the mission, everyone can work toward the goals needed to accomplish the mission. Change is difficult, but people are capable and willing to change when they understand the reasons. Without change and innovation, many successful companies would have been out of business a century ago. For example, Sturges started out in the suspender business. They recognized they could use their equipment and know-how to branch out into all types of woven material. They will stay competitive in the future because they actively encourage innovation from all members of the organization and reward it. Sturges has a worker who has been weaving on the same loom for sixty years. They have mothers and daughters working side-by-side on the Quality Improvement Team. The pride employees have is obvious in the factory and workers smile and say hello to the supervisors as they drop by. Oneida Ltd. started as a trap factory in the mid-19th century. They also sold canned produce and silk thread. Eventually, as the trap market disintegrated, and polyester thread became the norm, they used their metal-working skills to enter a new field— flatware. They still thrive on innovation today and you can buy Oneida silver, and their other products, anywhere. In addition to their market success, Oneida Ltd has an

interesting past. They subsidized houses and property for their factory workers in the early 1900s because management felt everyone deserved a descent place to live (Noyes p 95, 110, 142) with room for a garden and decent education for the children. Now, that was visionary, and many present day factory workers still live in those houses the company helped finance. There has never been a union at Oneida Ltd., and the workers feel they are better off without one since they have profit sharing, stock options, and a good standard of living without outside help (Noyes p.152). All of these successful organization treat all members with respect. Members know they are highly valued.

As our organization grows in our continuous improvement efforts, it has been enlightening to examine successful local organizations. Also, note that successful businesses in the area were happy to share information with us about their quality efforts. Each of them also stressed, even though they had won awards, they had so much further to go and were constantly identifying new opportunities for improvement. As NEADS grows in continuous improvement efforts, we will continue to use these strong examples of innovation and excellence from the community.

References

Creech, Bill. The Five Pillars of TQM. Truman Talley Books/Dutton, New York, 1994.

Crosby, Philip B. Quality is Free, The Art of Making Quality Certain. Penguin Books Ontario, Canada, 1979.

Deming, W. Edwards, Out of the Crisis. Massachusetts Institute of Technology Center for Advanced Engineering Study, Cambridge, Mass, July 1991.

Noyes, Pierrepont B. A Goodly Heritage, Rinehart & Company, Inc, New York, 1958

Air Force Quality Institute (AFQI), MSgt Susan Homes. The Quality Approach, Air University, Maxwell AFB, Alabama, 1993.

Scherkenbach, William W. The Deming Route to Quality and Productivity, Road Maps and Roadblocks, CEEPress Books, George Washington University, Washington, D.C., 1991.

Walton, Mary. The Deming Management Method. Perigee Books, The Putnam Publishing Group, New York, 1986.

Oneida Dispatch, AP and Aaron Gifford, "Oneida Ltd. sets sales record in 1995, increases dividend", Friday, March 1, 1996.

Chaos Theory And The Future Of Strategic Planning

Capt Marci Townsend

Capt Marci Townsend is a MAJCOM Quality Advisor at Headquarters Air Combat Command, Langley AFB where her current passion is strategic planning. Her background is in command and control and C-130 current operations. She received a BA in Russian from the University of Southern California and an MS in Management from Abilene Christian University. Marci is currently working on her Ph.D. in Administration/Management through Walden University.

Chaos Theory And The Future Of Strategic Planning

Capt Marci Townsend
HQ ACC/QI

Abstract

Organizational ability to change has become increasingly important over the past decade as the pace of change has continued to accelerate. Strategic planning is one way for organizations to focus their efforts on effective change. Recently writers on chaos theory have proposed that strategic planning is not possible and that only small organizational changes are feasible. This paper proposes otherwise and uses the concepts presented in chaos theory to shed new light on strategic planning and change in organizations.

Introduction

In order to survive in today's rapidly changing environment, today's organizations need to be highly adaptable. The purpose of strategic planning is to create adaptable organizations which are able to change easily. If nothing is going to change, then organizations should not waste their time creating plans to keep doing what they already are doing. Strategic planning provides the forum for an ongoing emphasis on innovation and change, yet several writers have proposed recently that chaos theory makes strategic planning futile and useless. (Svyantek and DeShon, 1993) This paper will explore the use of strategic planning to encourage innovation and change and how chaos theory actually provides some useful guidelines to consider when planning.

Strategic Planning and Change

Even if an organization is already performing very well, that does not mean they do not need to try harder. Past successes too often cause future failures. This is because successful organizations may see no need to continue improving, while the unsuccessful one will try even harder to improve. Losing to improved competition could cause large or small companies to go out of business, but the effects of losing are disastrous for military organizations. Disaster can be avoided with good planning.

207

One of the obvious benefits of strategic planning is that it helps organizations to identify their core competencies. Companies that are organized around these core competencies develop an internal stability that leads to well-defined boundaries while maintaining an openness to the external environment. (Wheatley, 1994) These core competencies will be different in each organization, but the one that every organization needs to have is the core competency of innovation. (Drucker, 1995) This emphasis on core competencies enables the organization to be more adaptable because it is not locked into firmly established and rigid boundaries about what the specific services or end products are, but thinks instead in terms of what they can do well.

Strategic planning also requires interaction with the external environment which is key not only as an input to the planning process, but also as an output. This external scan has been challenging for most who feel that it requires them to 'predict' the future. Some have also suggested that through strategic planning we create our reality, but in actuality we are simply evoking a potential that is already present. (Wheatley, 1994) This takes the guess-work out of what the future might bring. A good external scan looks at what has already happened that may influence our future, and how it could affect us. (Drucker, 1995) This gives a bit of control back to the planners who are involved in the process. Instead abstractly of 'guessing' what may happen, there is a concrete starting point — what has already happened.

Unfortunately, when doing our external scan, we can be very good at ignoring massive changes which may be going on all around us. This can be dangerous. Senge told the story of the boiled frog to highlight the dangers of ignoring gradually building threats.

If you place a frog in a pot of boiling water, it will immediately try to scramble out. But if you place the frog in room temperature water, and don't scare him, he'll stay put. Now, if the pot sits on a heat source, an if you gradually turn up the temperature, something very interesting happens. As the temperature rises from 70 to 80 degrees F., the frog will do nothing.

In fact, he will show every sign of enjoying himself. As the temperature gradually increases, the frog will become groggier and groggier, until he is unable to climb out of the pot. Though there is nothing restraining him, the frog will sit there and boil. Why? Because the frog's internal apparatus for sensing threats to survival is geared to sudden changes in his environment, not to slow, gradual changes. (Senge, 1990, p. 22)

Strategic planning should be the foundation for long-term changes in the organization, yet it is too often very reactive, short-term, or simply too abstract. Instead of becoming more future oriented, most plans focus more on the problems of today than the possibilities of tomorrow. Applying concepts from chaos theory help take the focus of planning away from the problems of today and towards the future.

Chaos Theory and Change in Complex Systems

According to Simon, "Chaos Theory and fractal geometry radically question conventional comprehension of equilibria, harmony, and order in nature as well as in other contexts; and offers, instead, a holistic and integral model which can encompass the true complexity of nature for the first time. They provide us with a much more adequate understanding of ecology and climatic developments, and thus the hope of being able to more effectively address our seemingly overwhelming global challenges." (1994, p. 1) Chaos is proving western science wrong. Some common examples of systems that seem to exhibit chaos include electrical transmissions, turbulence in air and fluid flows, stellar configurations, and even human physiological patterns such as brainwaves. (Gregersen and Sailer, 1993) The impact of the concepts in this theory is far-reaching and touches systems all around us.

Chaos has been around for a very long time. According to Hesiod's "Theogony," Chaos existed not only before the world originated, but also before the gods themselves had appeared. (Simon) For about the past decade, the new power provided by computers has allowed researchers to begin to see things they could not see before and let them understand systems in new ways. By plotting simple mathematical formulas, computer programs generated complex designs. At first researchers thought this was a mistake in the computer program, but it was not long before they determined this was a common pattern and discovered order in what appeared to be complete disorder. If a simple system could behave in such complex ways, what does this say about the predictability of behavior in complex systems? With these and other findings, the old mechanistic approach to understanding systems has come into question. The table below sums up the ideas proposed by chaos theory.

WHAT IS CHAOS?

• A random vacillation within a certain range
• A constrained type of randomness
• A dynamic system which:
      •operates under a wide variety of conditions
      •makes things adaptable and flexible
      •is difficult to predict with precision
• A process which can be explained by nonlinear reiterating equations
(The term "Chaos Theory" was coined by T.Y. Li & J. A. Yorke in 1975.)

WHAT IS A FRACTAL?

• A geometric pattern left behind by chaotic actions
• A shape of varying size with similar shapes of finer detail
• A form in which each section can give rise to a similar pattern which may be slightly different than the original
• The measurement of the figure will vary depending on the type of ruler used as a measuring device
• The dimension of the figure is between 1-2 or 2-3, thus, there is a fractional dimension.
(The term "Fractal" was coined by Benoit Mandelbrot in 1975.)

WHAT ARE SOME EXAMPLES OF THE RELATIONSHIPS BETWEEN CHAOS AND FRACTALS?

CHAOTIC PROCESS	FRACTALS
Seashore	Coastline
Atmospheric Pressure	Clouds
Earthquakes	Rock Formation
Embryonic Development	Human Body (blood vessels nerves, ducts, veins)

Figure 1 - Chaos and Fractals (from Simon)

Chaos and the Behavior of Complex Systems

The Second Law of thermodynamics is one of the concepts being challenged by chaos theory which has the broadest implications. The Second Law holds that, as an entropic system, everything tends towards disorder, yet all around us we see complexity flourish and researchers who are looking for a true understanding of nature's habits have found the laws of chaos to be more helpful. (Gleick, 1987) The Second Law has always had far reaching implications well beyond the realm of science and was used to help explain the disintegration of societies, economic decay and even the breakdown of manners, etc. (Gleick) In a purely entropic system where the only certainty is disintegration, there would be no need to plan for the future. This theory comes into question as chaos suggests that not all systems tend towards disintegration and complete disorder.

Chaos theory has led to a new relationship between order and chaos. Both can now be understood as mirror images which actually contain the other and both exist in a continual process where a system can leap into chaos yet within that chaotic state, be held within parameters that are well ordered and predictable. (Wheatley, 1994) We are starting to understand that order, conformity and shape are not created by complex controls, but by the presence of just a few guiding formulae or principles. (Wheatley) Chaos theory also says that if we look at a seemingly chaotic system long enough, with the perspective of time, it always demonstrates its inherent orderliness and even the most chaotic of systems never goes beyond certain boundaries and stays contained within a shape that we can recognize as a system's strange attractor. (Simon, 1994)

Strange Attractors

The strange attractor comes into play at the time when everything should fall apart. Wheatley calls it the basin of attraction, the space that the system is magnetically drawn into. (1994) These were found by the speed of today's computers where researchers could observe millions of moments in a system's history as it careened back and forth violently with the computer drawing rapid lines zooming back and forth across the screen. (Wheatley) As you watch though, the lines begin to weave into a pattern and an order to the disorder appears takes on a distinct shape. This shape is guided by the "strange attractor." An example of this concept can be seen in the Lorenz attractor. Edward Lorenz, a meteorologist at MIT discovered, "...around 1956 the lack of predictability in deterministic systems by studying a mathematical system which was designed to make long-range weather predictions. He found that very slight differences in input often lead to totally different, and unexpected outputs. Lorenz used very delicate feedback systems consisting of twelve ordinary differential equations. He thereby established what has become known as The Lorenz Attractor..." (Simon, 1994, p. 34) The Lorenz attractor provides a clear picture of the boundaries and patterns that are created by chaotic systems.

211

Fractals

Another concept introduced by chaos theory is the idea of fractals. The term 'fractal' came from the Latin word, frangere, which means to break. Fractals are defined as the shapes and patterns that are left behind by chaotic activity and they exist all around us. Figure 1 also describes fractals and gives examples of where they can be found. Fractals can be found in nature, organizations, society and even nationalism is an intricate fractal design. (Simon, 1994) This has always been true, and although the dynamics of it seem very basic, the tools have just come into existence which make this formation of patterns understandable. (Gleick) The Sierpinski gasket provides a simple illustration of what a fractal is. This classical fractal was introduced by Waclaw Sierpinski, a polish mathematician at Lvov and Warsaw University. The gasket and the process for creating one is depicted in figures two and three. To create a Sierpinski gasket, you simply find the center points on each side of the triangle and connect them to create another triangle within the first one. Continue doing this within each triangle that results and you can keep going forever. This picture demonstrates the infinite characteristic of fractals and figure as you can keep making smaller and smaller triangles to infinity. The triangles, like fractals, will be of varying sizes, but are similar in shape.

Although the concepts of chaotic behavior, strange attractors and fractals may seem to have no place in the organizational setting, they are useful concepts to apply to strategic planning and to organizing for innovative change.
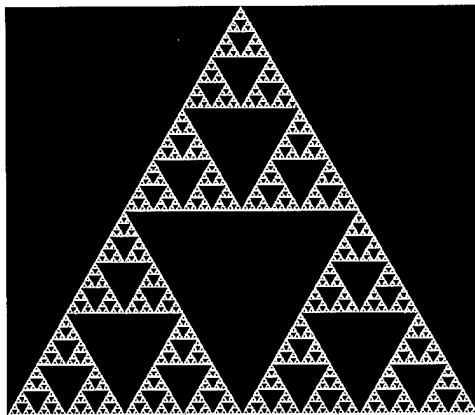
Figure 2 - The Sierpinski Gasket

Figure 3: The Process for Creating a
Sierpinski Gasket

Figure 2: The Sierpinski Gasket

Using Chaos Theory and Strategic Planning for Organizational Change

Planning can be frustrating. In spite of the best laid plans, there are always influences that we cannot see or strange things that seem to pop up everywhere we look. This frustration is not necessarily eased by chaos theory which radically questions our conventional belief in equilibria, harmony, and order. (Simon, 1994) Today, our most sophisticated method to get around this complexity is to build elaborate and detailed process maps and systems which are too often influenced by our traditional Newtonian quest for predictability. (Wheately, 1994) We assume that if we can manage to put all of the variables on the map, that we can manipulate them to get the exact outcomes we want. What Wheatley says, challenges us to see beyond these tiny fragments and to look at our systems as a whole, stepping back far enough to appreciate how things move and change as one coherent entity.

There is a metaphor which says that we need to be able to "step back" far enough from the details in order to be able to "see the forest through the trees" but according to Senge (1990) most of us just see lots of trees when we step back. We pick our favorites and then focus all of our attention and efforts onto changing them. One of the benefits of thinking of our organizations in terms of systems is that it will help distinguish between high- and low-leverage changes in highly complex situations by helping us look at the underlying structures which generate change. (Senge)

Chaos and the Behavior of Organizational Systems

Many researchers who were studying chaotic dynamics discovered that the disorderly behavior of these simple systems really acted as a creative process. "It generated complexity: richly organized patterns, sometimes stable and sometimes unstable, sometimes finite and sometimes infinite, but always with the fascination of living things." (Glecik, 1987, p. 43) Researchers were intrigued and surprised by these discoveries and were led to explore new and different things rather than try to predict what might happen. Classical science has always had the ideal goal of discovering predictability in physical processes. According to Prigogine, "...total predictability was never more than a theoretical possibility. Yet in some sense this unlimited predictability was an essential element of the scientific picture of the physical world." (1980, p. 214) Gregersen and Sailer (1993) felt that some social systems are characterized by "chaotic" behavior which makes it impossible to predict the future behavior of that organization. This becomes apparent in strategic planning. Anyone experienced with planning understands that very often new things pop up which make plan implementation difficult, if not impossible.

One reason for this unpredictability is what chaos theory has identified as the extreme sensitivity of systems to initial conditions where tiny variations become amplified until they have huge consequences. Where linear relationships propose that a given cause has one effect, in a non-linear relationship, one action can have several different effects. The interactions is a non-linear become so complex that the links between 'cause' and 'effect' can

completely disappear. Edward Lorenz illustrated this concept with his description of the butterfly effect. This idea proposes that a butterfly flapping its wings in the Amazonian jungle may trigger a hurricane in New York, but we can never know for sure. This same concept can be seen in the introduction of changes in organizations. Very small signals sent out by the organization's leaders (good or bad) could have simply huge effects on whether or not the changes are adopted by the entire organization. One small negative comment by a senior leader about proposed changes, can escalate as it moves throughout the organization and can completely destroy change efforts. Yet, it is impossible to determine the true origin of organizational problems by the time senior leaders realize they exist.

Organizational Strange Attractors

Chaos lurks in every system, but whenever it erupts, it will never exceed the bounds of its strange attractor. (Wheately, 1994) It would be beneficial then to identify strange attractors in organizations so that they can be influenced when change is needed. "Is there a magnetic force, a basin for activity, so attractive that it pulls all behavior toward it and creates coherence? My current belief is that we do have such attractors at work in organizations and that one of the most potent shapers of behavior in organizations, and in life, is meaning." (Wheatley, p. 134) This concept of strange attractors can be found in the organization's culture, history and symbols, which all combine to become elements of the organization's overall purpose and meaning. According to Simon, these strange attractors are what makes up the perceived meaning or "purpose" of the entire organization. (1994) These "strange attractors" are influenced by strategic planning through the development of an organizational foundation built upon common values and truly inspiring missions and visions.

This sense of meaning becomes even more essential when an organization undergoes changes. Wheatley said that she had seen companies make deliberate use of meaning to help them move through times of traumatic change. (1994) It is a simple, yet powerful way to help the organization move in a new direction while easing the trauma of change for the employees. Just as Wheatley described the strange attractor as a basin of attraction that the system is magnetically drawn to, this sense of organizational purpose or meaning should not be hidden, but should be apparent in each and every corner of the organization. While strange attractors help to guide the direction of the system, the concept of fractals provides an interesting way to explore how an organization should be structured.

Fractals in Organizations

Just as fractals can be found everywhere, even in nature, they also exist throughout organizations. The best organizations have a fractal quality in that any observer can understand the entire organization's values and ways of doing business by watching any one person in the organization, whether that person is a senior manager or a janitor. (Wheatley, 1994) There is a self-similarity in the individuals within the organization despite the complexity of the roles they play and the different levels that they work at. (Wheatley)

Because of this concept of self-similarity, fractals also suggest that we should not constantly search for finer and finer measures of more discrete parts of the system, but should instead look for themes and patterns rather than isolated causes. (Simon, 1994) Shewhart and Deming used these concepts in their work with variation and efforts to keep processes in control by differentiating between special and common causes for variations. (Neave, 1990) Beniot Mandlebrot, creator of the Mandlebrot Set depicted in figure four, provided good insights into this need to measure at the appropriate level. According to Wheatley, Mandlebrot's seminal fractal exercise was the simple question he asked, "How long is the coast of Britain?" (1994, p. 128) Usually his colleagues laughed at him or were insulted by what they saw as a silly question. But there is no answer. The closer you look at any coastline, the more there is to measure. You could measure counting for each cliff, each big rock, or each and every grain of sand and get a larger number on into infinity. The coastline is a fractal landscape and since there is no definitive measurement, what is important is to find the quality of the system and what distinguishes it from other fractals. (Wheatley, 1994) Fractals then teach us a useful lesson that it is senseless to keep searching for finer and finer measures of our organizations. There is no end to this search. Look back at the Sierpinski gasket in Figure 2 and think of it as your organization. How helpful would it really be to look just at the tiniest triangle? Actually the tiny triangles should be rolled up into the bigger ones for a more "big picture" measurement. Many of our organizations have gone a bit overboard on the amount of measuring they are doing. "We've developed graphs and charts and maps to take us into the future, revering them as ancient mariners did their chart books. Without them, we'd be lost, adrift among the dragons. We have been, after all, no more than sorcerers, the master magicians of the late twentieth century." (Wheatley, 1994, p. 26)

Figure 4: Mandlebrot Set

215

Chaos and Self-Organization

Many believe that a distinction needs to be made between good and bad chaos. Bad chaos should be avoided at all costs, but good chaos implies self-organization and evolution to a higher and more adaptive level in which the organization can evolve into a better version of itself. (Simon, 1994) Like "empowerment," the term "self-organizing" is too often misinterpreted as letting the inmates run the asylum. The concept of self-organization scares off many who see it as a loss of control over employees and the work that gets done. Self-organization does not propose that everyone in the organization just gets together and haphazardly decides how to organize themselves. It does mean that the organization is structured naturally around its most important processes and key core competencies. This requires a hard look at how work really gets done, and then reorganizing to meet that natural work flow. This is one of the most difficult changes proposed by chaos theory, because it requires such massive structural changes that visibly impact a large part of the organization.

Conclusion

While chaos is defined as the final state in a system's movement away from order, strategic planning is the way our organizations strive to make order out of our futures. These two concepts seem to be radically divergent at first glance and chaos is not an easy concept for us to grasp wholeheartedly and welcome with open arms. As Wheatley said, "It is hard to welcome disorder as a full partner in the search for order when we have expended such effort to bar it from the gates." (1994, p. 22) Yet, to survive, organizations must become adaptable and be organized around their core competencies. It will only be through highly developed innovation skills and rapid ability to change that organizations will be able to adapt to their future, no matter how chaotic it may be. These continual change efforts are nothing new. They live in strategic planning.

References

Drucker, P. F. (1995). Managing in a time of great change. New York: Truman Talley Books/Dutton.

Gleick, J. (1987). Chaos: Making a new science. New York: Penguin Books.

Gregersen, H., & Sailer, L. (1993). Chaos theory and its implications for social science research. Human Relations, 46(7), 777-802.

Neave, H. R. (1990). The Deming dimension. Knoxville, TN: SPC Press.

Prigogine, I. and Stengers, I., (1984). Order out of chaos: Man's new dialogue with nature. New York: Bantam.

Senge, P. M. (1990). The fifth discipline: The art and practice of the learning organization. New York: Doubleday.

Simon, M. K. (1994). Mountains are not triangles: A maiden voyage through the science of chaos, fractals, dynamical systems and complexity. Del Mar, CA: MathPower.

Svyantek, D. J., & DeShon, R. P. (Fall, 1993). Organizational attractors: A chaos theory explanation of why cultural change efforts often fail. Public Administration Quarterly, 339-355.

Wheatley, M. (1992). Leadership and the new science. San Francisco: Berret-Koehler.

Operation Restore Hope:
Closing The Gap In Quality Through
Innovative Leadership

SrA Pamela L. Boitel

Mr Thomas M. Downs

Senior Airman Pamela L. Boitel is an Information Manager working with the Air Force Quality Institute team, Maxwell Air Force Base, Montgomery, AL. She has completed two assignments previous; the Support Group Commanders office, Bitburg Air Base, Germany; the 60th Group Orderly Room and the Wing Administrative Office, Lowry Air Force Base, Denver, CO. She has a goal to complete an Undergraduate degree in Education (Secondary), from Troy State University of Montgomery, AL and is currently working a certification in an International Correspondence course in Animal Science. She enjoys gardening and landscaping and working with her four dogs. She is married to Senior Airman Jeff Boitel and they have two children; Kelsey Leigh and Arie Rose.

Thomas M. Downs is a Performance Consultant/Instructor with the Air Force Quality Institute at Maxwell Air Force Base, Montgomery, AL. He is currently involved in the development and delivery of the Unit Self Assessment Distance Learning course. Additionally he serves as a consultant on Unit Self Assessment and Strategic Planning interventions, as well as being actively involved on the Team Quality Awards and the SECAF Unit Awards programs. He has over twenty years experience in Instruction, Consultation and Leadership training and development. He is a trained Facilitator and Master Instructor. He received a BS degree in Psychology and an MS in Personnel Counseling from Troy State University, Troy, AL. He enjoys Public speaking, reading, landscaping and traveling with his wife, Lola.

Operation Restore Hope:
Closing The Gap In Quality Through
Innovative Leadership

Mr. Thomas M. Downs and SrA Pamela L. Boitel
Air Force Quality Institute

Abstract

The authors present the concept of Hope as it pertains to Innovative Leadership for the journey to a Quality culture. Providing Hope, as a leadership concept, is presented as an example of innovation to everyday leadership style. It is the author's contention that when leadership style emulates trust and open two-way communication, the result will be an environment where creativity, innovation and breakthrough thinking can flourish. The development of this environment, especially with all the changes this cultural shift is demanding, is crucial to our success as we travel the transformation highway.

Hope, as embodied in effective leadership, can be a bridge to the new culture. The authors discuss one of the keys is for leadership to recognize the motivating energy of this concept and apply it to their everyday leadership style. The presentation develops the outline of the Quality journey while suggesting applications of this innovative style and providing referenced sources as backup.

Innovative Leadership

"Where there is no hope for the future, there is no power for the present." Although the author for this quote is unknown, at least to these writers, it seems clear the author understood the powerful motivating force of Hope.

Protect the leader, for in them is embodied the living Hope. In battle, the leader is protected from harm, in many instances, at all costs. A soldier knows the effect a hopeful leader can have on the outcome of many situations, even those aggravated by the heat of battle. They are willing to do this, even to the extent of risking their own personal safety. Napoleon Bonaparte is quoted as saying, "A leader is a dealer in Hope." The willingness is there when the leader is providing Hope. Hope in the form of direction and motivation to do what it takes, to Aim High and achieve victory.

Peacetime leaders tasks are really no different, and certainly no less important, for they too, must provide hope to those entrusted to their care. They must provide direction through leadership and motivation, through examples in daily operations for all to have a sense of victory through daily accomplishments.

Leaders must be able to communicate. Communicate our values of Integrity First, Service Before Self and Excellence in all We Do. They must provide, through examples of commitment and motivation, the hope that lets us all know they "understand" and "identify" with us.

Motivation can come in the form of an encouraging word or by providing an environment that encourages trust and open communications. It becomes even more important during times of constant and even radical change. Leaders must be constantly aware of the present operating environment and of the important effects a positive direction and a hopeful environment have in propelling the organization to the future.

We can withstand almost anything when we understand there is hope. Hope to make it through, hope that we will be all right when this present uncertainty passes and most importantly, to have the hope that it will be worthwhile and trust that things will be better as a result. Hope in a brighter future as a result of all the hard work.

What Hope can do:

1. Listens for answers when no one is talking.

2. Searches for answers when no one is asking questions.

3. Brings the victory when it has yet to be won.

This kind of hope leads to faith in a victorious outcome brought about by a caring leader's relationship with their people.

A question you should ask yourself is, "How am I providing hope to those who look to me for direction, motivation and a path that leads to victory through a team effort?" This may be one of the most important questions we can all ask ourselves during this time of unprecedented change. For when we provide the hope our people need, this can be a time of unprecedented growth and opportunity for all of us. The choice of providing hope, through caring leadership, is ours to make. The alternatives carried by any other decision will be even more challenging.

How people handle difficulties and make decisions, so they can go on with life, is more often than not a reflection of the leadership present at the time. Depending upon the examples provided, the difficulties can make us tall and strong as we learn to grow around them. The alternative is, they can make us bitter and confused, rendering us unwilling and

unable to do the job that needs to be done. This is not to say that each individual is relieved of their personal responsibility in all this, but leadership is tasked with creating the environment where prudent decisions can be made without fear of reprisal. Bill Gates, CEO of Microsoft, may sum it up best in his book, The Road Ahead. He talks about a lot of people being pushed out of their comfort zones, but that doesn't mean that what they already know won't still be valuable. It does mean that people and organizations will have to be open to reinventing themselves-possibly more than once. Organizations and governments can help train and retrain workers, but the individual must ultimately bear principal responsibility for their own continuing education.

We will need the whole team on the other side, just as we need the whole team to carry us through this difficult part of this transformation journey. Leadership provides the Hope that our problems will not destroy us, but rather serve as opportunities to make all of us stronger and better prepared to face the challenges of the future. We must know and trust in our hearts that we have the skills necessary to succeed or that leadership will give us all the opportunity to develop them. This level of confidence and trust is key to the whole journey being successful.

As we move to a discussion of the steps involved in the transformation journey, I ask that you keep in mind the innovative leadership style mentioned above. It is really more about developing relationships that it is about giving orders. It is about developing relationships consistentent with our cultural values of leadership and followership. We can all recall from leadership classes past, the discussions about personal integrity which forms the foundation for self-respect. When we develop a healthy self-respect tempered by character, we begin to understand how we need to develop a respect for others as they are going through the same process. When we make this part of our daily operating style we begin to understand and appreciate the needs of others. This is a critical step for innovative leaders, as they help guide our most precious resource, our people, through the transformation process. As we move to a discussion of the stages of the Quality transformation journey, we ask the reader to keep in mind how the principles of Innovative leadership can be applied at each stage. Numerous authors talk about the key aspects of a Quality journey and most all agree upon at least five main stages or at least the steps involved in these stages. The five stages are:

1. Decide

2. Prepare

3. Start

4. Expand

5. Integrate

We will use these five stages of the transformation journey as a vehicle to discuss examples of the use of innovative leadership to help ensure personal and organizational success in reaching the destination of Quality Air Force. The first stage or step is that of actually deciding to begin the journey, for without an upfront commitment, especially from leadership, the journey is doomed before you begin.

Stage 1: Decide

The organization must decide why it wants to change and adopt a Quality approach and start to formulate the reasons for the decision. Although this stage is typically done by senior leadership, it could also be an excellent place to start our practice of innovative leadership. We could solicit inputs from the organization's members as to their understanding of why we might want to adopt a Quality approach to our mission. The decision rests with senior leadership, but soliciting member input will serve a dual purpose. First, it will facilitate initial buy in and later commitment to the decision by all members and second, it will help senior leadership begin to realize the level of understand the members have about Quality. This can be accomplished through organization wide surveys/questionnaires, focus groups and interviews. The information learned here about the organization can help the leadership formulate a plan to move to the second stage.

Phase 2: Prepare

Top leadership and upper management must take the lead during this stage. They must receive the initial training and help cascade it throughout the organization. A Quality Council must be formed-chaired by the leader of the organization. A strong infra-structure of supporters and facilitators must also be put into place. This will send a clear message throughout the organization that leadership is committed to the transformation and is willing to take the first steps of the journey.

The following are three very key steps in preparation for the Quality journey:

A. The reasons for the change must be well formulated and communicated throughout the whole organization.

B. A clear vision of where the organization is headed as a result of the decision to pursue a Quality approach, must be formulated and articulated to all members of the organization.

C. Well thought out plans, with inputs from all levels of the organization, must be developed and published. All members must have access to the published plans and a clear understanding of how they can have input to the update and revisions of these plans.

222

These action steps should begin with attainable goals for the organization to learn the new processes. The members must learn by doing so they will learn this has application to their daily lives and that it is just not more management theory. Successes must be communicated throughout the organization through developing listening posts within the organization.

In review, the preparation stage involves:

1. Educating top management.

2. Forming a Quality Council.

3. Provide staff and support.

4. Prepare an explanation of the need for change;
    a. Develop vision and goals
    b. Develop and communicate a plan of how to get there.

5. Select pilot projects and teams.

6. Communicate to the whole organization the successes and progress.

In the next stage, the start stage, we will see how important it is to the members of the organization to actually see something begin to happen. When the members of the organization see leadership start to implement the plans, they too, will become motivated to start the journey.

Stage 3: Start

Choosing how to start your journey can be critically important. This might be a good place in the journey to remember a quote from Teddy Roosevelt, "Do what you can, with what you have, where you are." Leadership at all levels of the organization would do well to lead and promulgate this to all members of the organization. Although it is great to have a plan, do not get into the trap of waiting until everything is perfect to start. This will frustrate all of the members of the organization and lead to not accepting any improvements unless they are perfect. This can send the wrong message as to what the goals of the transformation journey are about.

If you start too timidly or ambitiously, either will delay results because many actions are started but very few are completed. The most successful way is centered around two main issues:

1. The training and support of pilot project teams to ensure their success.

2. The building of the infra-structure to support many more teams in the future.

These two steps help to establish and communicate a clear set of expectations around organizational requirements. It is important during this stage for senior leadership to maintain a high level of visibility to all members of the unit. It is equally important to sustain the momentum, so senior leaders are viewed as actively embracing these steps to the new culture. Leadership's public embracing of these steps, serves to reinforce, to all members, the message of hope so critical to the success of the journey. All members must be able to see the linkage of these pilot project teams' success to the total quality transformation process.

Leadership's supportive role during this stage is to make it OK to spend the time and money to make the teams successful and communicate the successes throughout the organization. Management must also have a forum where they talk only about these pilot projects, their success and plans for future teams.

As you are building an infrastructure to support these project teams, it is necessary to have an internal assessment that measures the organization's success in the various Quality components-revolving around three types of measures:

1. A measure of success in how we retain present customers and how we get new ones.

2. Design a roadmap to discover and improve in the areas of waste, this will reduce cost, increase revenue and improve customer satisfaction.

3. An employee care survey concerning the attitudes and beliefs of the company given every year to all employees.

Another component of developing the new supportive infrastructure is to develop a leadership system that that will encourage and not inhibit Quality. This can become one of the critical issues in any organization's transformation to a Quality culture. Dr. Richard I. Lester, in his writings "Creative Leadership for Total Quality" wrote, "Without the pillar of creative leadership, there can be no serious quality achievements." The role of leadership in providing hope during this phase can be crucial to the overall success of the initiative.

One example for developing this infrastructure is that of how work is evaluated and rewarded-everything must be tied to the new Quality Process Improvement infrastructure. According to the Baldrige examiners for the SECAF Unit Quality Award judges, this is where most Air Force organizations are today. Along with being data rich and information poor, they feel these are the next critical areas for the Air Force Quality initiative to address. The approach leadership uses to address the issue of evaluating and rewarding work, will clearly demonstrate to the members the commitment they have to the success of the Quality transformation.

During this stage, the organization needs to continue to reinforce the system so it can support large numbers of significantly successful projects. The successes achieved must continually be communicated throughout the organization at every available opportunity. This can also be a great opportunity for leadership to develop and utilize a reward system that is directly tied to these successes. We have all heard the old saying "What gets paid attention to, gets repeated." We have a real opportunity to prolong and increase our successes by linking the reward system directly to them and the behavior we want repeated. This behavior pattern by leadership builds the self respect and confidence of the organizational members to be even more creative and motivated to improve the processes and systems of the unit.

Let's review the key strategies for the Start stage: To be successful, we need to:

1. Complete successful pilot projects with adequate training, support and evaluation.

2. Build an infrastructure that establishes the four key dimensions of Quality (that of; delighted customers, empowered employees, higher revenues, and lower costs) and mechanisms for measuring these dimensions.

3. Assessments that measure:

   A. Market standing. How successfully do you keep present customers and get new ones?

   B. Costs of poor Quality.

   C. Internal Quality structure.

   D. Existing Quality systems and how adaptive are they to incorporate future project teams.

   E. The revision of key management practices to support Quality.

   F. The creation of a project process that generates many successful projects. It should include project nomination, selecting the best, assigning teams to them, establishing a system to review progress.

   G. Communicate the results and plans to the entire organization in an ongoing manner.

The experiences of the success of the pilot projects and the infrastructure is needed for movement into the next stage. At this stage leaders need to communicate these successes throughout the organization, as members begin to see that business as usual will not take the organization to where it needs to go. Leaders will need to ensure these successes serve as motivation to continue the journey. Now more than before, leaders need to be congruent in

what they say and what organization members see them do, as they provide hope to energize everyone with the hope that it is worthwhile. Worthwhile, personally and to the whole organization.

Stage 4: Expand

In the Expand stage, we start to moving towards the revolutionary rates of change that creates Quality leadership. If the leadership of the organization has been successful in providing hope to its members during the earlier stages of the cultural transformation, the shift to this level will become a welcome challenge to the total organization. Leaders, at all levels, can demonstrate this innovative leadership skill necessary to energize the people who will carry the organization through this stage of the journey. A total commitment by all members is vital to the establishment of Quality leadership throughout the organization as it experiences change and success on many different levels.

This expansion takes places on several fronts:

1. The addition of many more project teams, empower the members, and give them the resources necessary to their success.

2. Broaden the scope of team activity and types of teams:

    A. Project improvement teams-to improve existing processes.

    B. Quality planning teams-to plan for new goods and services. The key is a quick response.

Both types of teams mentioned are kept on the Quality track and remain efficient through effective Quality control. Quality and the improvement of Quality are the two main issues-if these are not controlled the whole process could result in poorer Quality. Business/mission process Quality management teams are introduced during this stage.

Leadership, again has the important role of providing hope and guidance, as the very core processes of the total organization are reviewed, improved and maybe even reengineered. Work processes can be a source of security for organizational members and they have to realize, through reassurance by leadership, they can be successful working in the new processes. If our motivation efforts have been successful to this stage, continuing the momentum will keep the hope alive. If reluctance is encountered, leadership may have to move back to earlier successes and reinforce the work-reward structure.

Once the whole team is back on track, the organization can again focus its efforts on reviewing, improving and reengineering key cross functional management processes. For this to be successful throughout the entire organization, the teams assigned manage the processes on a continuing permanent basis. This helps focus the emphasis of Quality on every aspect of the organization's mission.

All of this requires more and continual training in the necessary skills. Training does not net cost you any money. The right training pays for itself many times over. It will save you in overall costs, new product and service development, overall process improvement and customer delight. According to the latest statistics, Motorola Corp. estimates a $30 increase in productivity for every $1 invested in training their people.

Expansion of Quality management also requires better and more systematic measures of Quality. An assessment needs to be in place that measures key result areas from top leadership through the supervisors down to the personnel delivering your goods and services.

The Quality effort must expand into all components of the organization, adapting it as necessary to any organizational cultural differences. You will want to maintain those core elements that are key to your business and then adopt the other elements culturally as necessary.

Expansion of Quality then, in an organization occurs on several different fronts:

1. A greater number of project Quality teams.

2. More types of Quality project teams.

    A. Quality improvement.

    B. Quality planning.

    C. Quality control.

    D. Business process Quality management.

3. Provide all necessary management training.

4. Measure Quality at all levels.

5. Include all organizational components.

You may have to go through the Expansion phase more than one time to strengthen the Quality culture throughout the entire organization. This is yet another opportunity for leaders to display innovative leadership to lead the organization through this stage of the cultural transformation. This would be especially important if this stage is repeated. Organizational members must be reassured that they and the organization are still on track and the stage is being repeated only to strengthen the Quality culture, and is not a result of poor leadership or a failure to get the desired results.

Stage 5: Integration

Integration is the fifth stage involved in moving an organization to a Quality culture. Many organizations have had significant continuing results integrating Quality into everyday business procedures and making Quality part of their everyday worklife.

This Integration happens in four ways:

1. Clear Quality goals deployed throughout the organization.

2. These goals are stretch goals.

3. These goals are tied into the organizational strategy (business plans and strategic planning).

4. The goals are deployed to everyone in the organization.

To meet these goals every individual must have a clear role and responsibility with respect to Quality. This widespread participation requires top leadership's full and active support. All members of the organization must be educated in Quality and teams must be trained. They must be able to own and confront their own problems and have the right to solve many of those problems themselves. The level of success most often depends upon the extent the people, who are directly involved in the delivery of the product or service offered by your organization, are trained and the empowered to make decisions at the point of delivery

Many Quality goals can not be met without new ways of managing and reengineering major cross functional organizational processes. Work in the future will be around processes and not the typical hierarchical military model we think of today. Different authors and researchers vary on their opinion of the exact model, but all agree it will be different from the model of today. The role of leadership will be two fold. First is to keep the team motivated and focused on the mission using the concept of innovative leadership and the second is to help ensure the new model of work, as it is developed and applied, is consistent with our warfighting doctrine.

There is no effective Integration of Quality into the mission without the involvement of upper level leadership in the systematic reviews and audits of Quality. Because of increased competition, barriers, constant changes in available resources and shifting cultures, the Quality journey will never reach a final destination.

Organizations are able to deal with all of these changes because they have deployed and integrated these concepts into the very fiber of their core key mission processes. They have done this by:

    A. Fully deploying strategic Quality goals.

    B. Participation by everyone-Full integration.

    C. Structured management by cross functional processes.

    D. Established systematic reviews and audits by upper level leadership.

A successful Quality journey will include a foundation of:

1. Strategic Quality planning.

2. Executive leadership.

3. Customer focus.

An infrastructure that includes:

1. A Quality system.

2. Customer supplier relationships.

3. Total organizational involvement.

4. Measurement and information.

5. Education and training.

Processes for managing Quality:

1. Quality planning-to design quality into products and services.

2. Quality Control-to prevent deterioration.

3. Quality Improvement-to make Quality better.

All of which will deliver the reasons why you began this journey in the first place to get the results of, lower costs, improved operational performance, empowered employees and delighted customers.

In summary , we have talked about the concept of innovative leadership, developed a roadmap for our journey to a cultural transformation and discussed examples of the ways leaders, at all levels, can demonstrate this innovative leadership skill. This skill, the writers believe, will be necessary to energize the entire Air Force team to continue the journey. The key is for everyone to recognize the motivating energy of this concept and apply it to their everyday leadership style. When leaders at all levels of organizations appreciate the transformational power of this concept, they will, through its application, provide the hope that all of the effort is worthwhile. For it to have long-lasting effects, it must be demonstrated personally and organizationally throughout the entire United States Air Force.

As leaders, moving with our people along the Quality Transformation journey, we would do well to remember one very important thing-Build our people and they will build tomorrow. Dr. Kenneth Blanchard (famous for the concept of Situational Leadership and The One Minute Manager) talks about when the best leader's work is done, the people say, "We did it ourselves.

Selected Bibliography

American Society for Quality Control and The Juran Institute. Quality Management Report, 1994.

Blanchard, Kenneth; Zigarmi, Patricia; and Zigarmi, Drea. Leadership and the One Minute Manager. William Morrow and Co. New York, NY, 1985.

Fitton, Richard A., editor. Leadership: Quotations from the Military Tradition. Westview Press, San Francisco, 1990.

Gates III, William H. The Road Ahead. Viking Penguin Press, New York, New York, 1995.

Godin, Seth., Wisdom, Inc. HarperCollins Publishers, Inc. New York, New York, 1995.

Lester, Richard I., Ph.D. Quotation. Creative Leadership for Total Quality. Air Force Quality Institute Symposium Proceedings, 1993.

Consultant-Facilitated Unit Self-Assessment (C-FUSA)

Photo
Not
Available
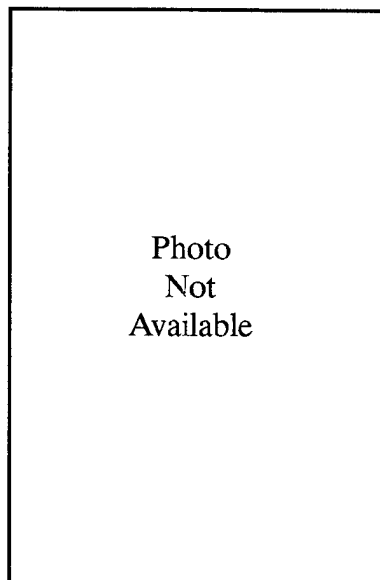
Capt Patrick H. Sakos

Capt Sakos is Senior Consultant, Center Assessment at Aeronautical Systems Center, Wright Patterson AFB, Ohio. He enlisted in the Air Force in January 1969 as an Airborne Navigational Aids Technician. In 1981 he was accepted into the Airman's Education and Commissioning program and began attending classes at the University of Utah. Where in 1984 he received his Bachelor of Science degree in Electrical Engineering. He was commissioned a Second Lieutenant at Officer Training School.

Consultant-Facilitated Unit Self-Assessment (C-FUSA)

Capt Patrick H. Sakos
Aeronautical Systems Center Quality Air Force Office, ASC/QI

Abstract

This paper addresses the streamlined approach Aeronautical Systems Center (ASC) developed to perform Unit Self-Assessments (USA). The approach had to do three things: 1) save time, 2) be broadly accepted by leadership and 3) make sense. Some of the discussions leading to the Consultant-Facilitated Unit Self-Assessment (C-FUSA) approach, a brief description of the sequencing used by units, the ASC/QI consultant preparation for the C-FUSA and the actual scoring event follows.

Consultant-Facilitated Unit Self-Assessment

Want to clear a room? Ask for volunteers to perform a Unit Self-Assessment. If anyone remains, perhaps you will hear comments regarding the personal lifestyle of the Quality Office Guru in charge—which couldn't be repeated in the presence of your mother. Also, you will hear comments that the effort was ineffective, it required too much effort or how none of the organization's leaders believe in USAs. This happens; however, it should not.

Aeronautical Systems Center (ASC) found three major stumbling blocks to effective USAs. First, education of the leaders and teams was hit or miss. Busy schedules seem to give everyone an excuse for not attending training. Those who did attend training left bewildered. Second, the man-hours required to perform USAs were excessive and no unit could afford to expend the same effort again—program/mission performance "is more important than assessment." Every leader recognized they needed to know how well their organization was performing. They also recognized that, when done properly, USA is a very effective tool; however, they needed a better method to use the tool. Third, trust in the feedback and use of the report information was lacking. Leadership frequently questioned how accurate the feedback was—"How much do these examiners know about us?" Another frequent query was "How is this information going to be used?" The underlying question was "Are we going to be penalized for being honest?"

ASC decided to find a better way. The Quality Office (QI) put some of its finest minds together to come up with a solution. Two questions came to the forefront, "When did people feel comfortable with the Quality Air Force (QAF) Criteria?" and, "How do we get the senior leaders really involved?" The answer to the first question was, "When they were

232

in class and an instructor was present." The answer to the second jumped out, "At offsites!" Thus arose the concept of using a consultant to facilitate a leadership offsite to perform the USA.

Other questions needed answering. How do you prepare the leaders? How long will it take to prepare? How long will the offsite be? Who facilitates—contractor or government? How do you convince the leadership this is a viable approach? Is it viable? Will C-FUSA decrease the man-hours expended? As the group addressed these and other questions, the consensus became that the approach was viable, the man-hours required to perform C-FUSA should be less than 25% of what was previously expended and leadership would "buy-in" because the approach "made sense." Additionally, units would do their USAs at different times during the year, allowing the unit leadership choose the best time.

The use of contracted versus internal consultant/facilitators was investigated. The use of internal consultant/facilitators quickly proved to be more advantageous. Internal consultants are more familiar with the organizational structure. They can translate the criteria into Air Force and local terminology. Internal people also have the flexibility to reschedule and adapt materials to the customer's needs rather than strictly abiding by the conditions of a contract. Therefore, the idea to use contracted consultants was scrapped and the decision was made to proceed with internal consultants.

What is C-FUSA?

Consultant-Facilitated Unit Self-Assessment (C-FUSA) is a streamlined version of the Quality Air Force (QAF) Unit Self-Assessment. A quality consultant leads the senior leaders and process owners of each organization through a review and assessment of the organization. C-FUSA is based on the QAF Criteria, the Air Force's version of the Malcolm Baldrige Quality Award Criteria. A key point to remember when thinking about C-FUSA is that this is a true "self-assessment" NOT an inspection. C-FUSA's goal is IMPROVEMENT. Therefore, a conscious decision was made to keep "the score" internal to the organization. The C-FUSA process creates an environment in which the leadership team can do an open and honest assessment of their organization with improvement in mind. To maintain Center visibility, Center leadership is provided the Center overall average trend data, not individual unit scores.

During a C-FUSA, unit senior leadership identifies how the organization is or is not performing to each "Area to Address" of the Criteria. Leadership identifies strengths and areas to improve, or gaps. Scribes record comments, strengths and areas for improvement for inclusion in the final feedback report written by the consultants following the leadership offsite. The leadership identified gaps in the feedback report form the foundation for prioritized organizational improvement efforts. Leadership then uses the QAF scoring guidelines to score each area.

What are the benefits of C-FUSA?

Leadership Involvement.

Most of us have seen USA reports written by the units' best writers. These individuals gathered the data and wrote the reports which leadership signed, forwarded and shelved. The report was scored by an outside examiner, who sent a feedback report. Some Process Action Teams may have been formed to correct a few major gaps found, but on the whole, leadership often didn't agree with the feedback report ("They don't really know us or what we do.") or just didn't act on its results.

C-FUSA minimizes these problems. Senior leadership discusses the organization's approach, deployment and results. Senior leaders evaluate and score their organization, using the QAF scoring guidelines. Leadership's knowledge of their unit forms the basis of assessment—who better knows the organization and its strengths and areas for improvement? Their words are used in the offsite feedback report; therefore, ownership is maintained.

In-depth understanding of the criteria.

The only individual at the offsite who must have in-depth knowledge is the consultant. Leadership is given "Just-In-Time" training on the QAF Criteria. The support team receives the same awareness training and gets support from the ASC/QI Office during the information gathering period.

Flexibility.

When the entire Center had to perform all the USAs within a restricted time-frame, many units found themselves in a quandary. Do we interrupt the programmatic actions to do a valid USA or do we "fill the square?" The answer frequently was "fill the square." C-FUSA allows the Center the flexibility necessary to enable units to choose the best time period for their USA. The AFMC-established two-year cycle gives the Center plenty of time to have individual units perform their USAs before the Center USA Report is completed. C-FUSA can be tailored to meet the assessment needs of large or small units. All units are led through the assessment criteria in a manner which enables the leaders to spend the appropriate amount of time and effort on each area.
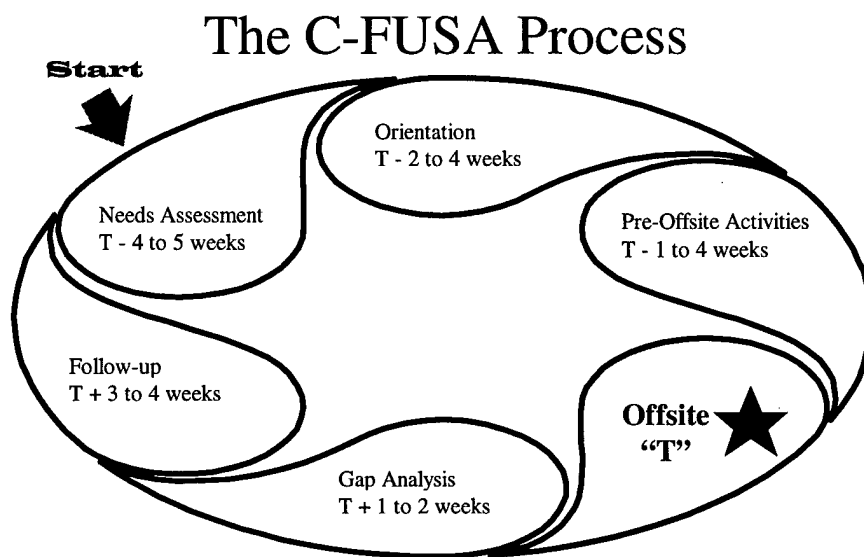
Awareness of C-FUSA.

Consultant-Facilitated Unit Self-Assessment has been discussed at senior leadership level meetings. Meetings have been held at the quality coordinator level and they in turn have passed the word that the new USA process is going to involve leadership more than worker bee level people. Information has also been published in the Skywrighter, the base

newspaper. Few people have not had the opportunity to learn about ASC's new USA process. The key here is to have everyone aware of how the process will work.

C-FUSA Sequence of Events

The C-FUSA effort for each unit spans four to eight weeks. Except for the offsite, no intensive amount of time need be dedicated to the effort. A few meetings, a little training, some information gathering and advance reading lead to a one to two-day offsite for senior leadership and process owners. C-FUSA utilizes data and information currently used by the organization, nothing new is created.

The C-FUSA Process

Start

Orientation
T - 2 to 4 weeks

Needs Assessment
T - 4 to 5 weeks

Pre-Offsite Activities
T - 1 to 4 weeks

Follow-up
T + 3 to 4 weeks

Offsite "T"

Gap Analysis
T + 1 to 2 weeks

Initial contact: The unit's quality coordinator contacts the quality office requesting a date for their C-FUSA. Because the quality office uses the "first-come-first-served" concept for scheduling C-FUSAs, the earlier a unit decides to schedule its assessment the more likely they will get their first choice time period.

Needs assessment: The initial meeting between the organization's leadership, the OPR and the quality office determines the scope and breadth of the assessment to include the size and composition of the organization to be assessed, training required, etc., and sets milestone dates. The quality office collects the information necessary to provide good facilitation during pre-work and at the offsite.

Orientation: The tailored QAF Criteria familiarization training is given to the senior leadership, process owners and the support team. What do the criteria mean? What data are necessary to address the criteria? For some organizations this may be in briefing format, while others may need a half or whole day of more focused training (depending upon the criteria knowledge base). Additionally, they are given a copy of "Understanding the QAF Criteria," a document giving an overview of the criteria.

235

Pre-work: The pre-work consists of completing the ASC/QI developed workbook. It leads the support team to the data the senior leaders need at the offsite. Before the offsite each senior leader receives a copy of the completed workbook. Organizational members become involved during this phase; since most firm data is in the hands of the workers.

Pre-offsite meeting: ASC/QI and the support team review the finished workbook. After insuring that all required data are included, the support team adds the workbook to an information package for the senior leadership. This package includes the workbook plus any other data the support team believes important for senior leadership to have. Leadership reviews their information package in preparation for the offsite.

Offsite: The offsite starts with a review of the information package and a scoring guidelines familiarization exercise/discussion. One of the tools the facilitator uses is a software package that asks leading questions. ASC uses a 54 question format (aligned with the 54 "Areas to Address" in the criteria). The questions are worded to start discussion. The consultant facilitates the discussion among the senior leaders until they are ready to score the area. After each category's questions have been answered, the software combines the area scores to score the category and gives some feedback regarding the organization.

Each category is scored individually in the following order:

7.0 Customer Focus and Satisfaction
2.0 Information and Analysis
1.0 Leadership
3.0 Strategic Planning
4.0 Human Resource Development and Management
5.0 Process Management
6.0 Performance Results

This follows the logical thought pattern of:

1. What customers, internal and external, do we serve and what products/services do we provide them? What success criteria must we meet?

2. What information do we have/need to insure we are meeting these requirements?

3. How are we, as leaders, "leading" our organization to meet the needs of our customers and people?

4. How are we planning to meet our customer's and peoples' requirements?

5. Are we developing our people and providing them the tools and environment they require to meet our customer requirements?

6. What processes do we manage/need to meet the requirements of our customers and people?

7. How are we, the organization, performing?

After all 54 "Areas to Address" are covered, the software computes the total Baldrige score for all seven categories and provides feedback. A summary of all seven categories is shown.

Follow-up: A feedback report is written using the senior leadership comments, successful processes, identified areas for improvement, etc. Included is the score the leadership determined and the software feedback. An executive briefing is presented to the organizational leadership team and then the same or similar briefing is provided to the organization as whole.

If desired by the organization's leadership, QI facilitates a gap prioritization exercise during the follow-up phase and assists in efforts to include the gap-closure plans into their Strategic Plan.

This is where the pay-off is. The results of the offsite are reviewed and acted on. Remember one of our premises is: "What leadership identifies as requiring fixing gets fixed." Because everyone is aware that the unit leadership is performing the USA, everyone is expecting to see results. Workers can see if leadership actually listened when they identified problems. Leaders have identified and taken ownership of areas for improvement.

Conclusion

Remember, the approach had to do three things: 1) save time, 2) be broadly accepted by leadership and 3) make sense. C-FUSA addresses all three ASC leadership concerns regarding performing USAs.

C-FUSA was estimated to require approximately 500 man-hours total effort per unit. Initial piloting of the C-FUSA process has indicated total time involvement to be less than 300 hours per unit. That includes the ASC/QI consultant, senior leadership and support team man-hours. ASC/QI will track this information. QI will use the QAF continuous improvement process (CIP) to improve the C-FUSA process.

ASC's leaders accepted this approach because of these attributes. C-FUSA enables ASC to involve its leadership in the USA process. Each leader maintains ownership of their unit's assessment. The process allows every unit to choose the appropriate time to perform their USA (given the two year window).

When assessing something, it makes sense to talk to the person(s) most knowledgeable on the subject. Air Force military and civilian leaders are the most knowledgeable people when it comes to their organizations. Also, to get things done, the boss has to want it to happen. Therefore, it makes sense to have the leadership identify what is working and what needs improving within the organization. Therefore, C-FUSA makes sense!

Epilogue

ASC is currently in the first cycle of C-FUSA. Initial unit response has been extremely positive. Workers and leaders have expressed how surprised they were to find the process is actually easy to follow.

Some leadership comments:

- "This was better than I thought it would be. Facilitation was outstanding. The score was about what I expected and I have received formal Baldrige training. This will be a real time saver."

- "I wrote down 10 or 12 improvement areas during the offsite. I'm not waiting for the feedback report."

- "It has given me a little knowledge of the 'nitty gritty' of each of our divisions."

- "Time well spent. Comfortable facilitation. Software was a strong point too."

- "The C-FUSA approach appears to be much more efficient than the labor intense system used in 1995. The results of the computer analysis seemed to accurately assess the state of our quality efforts."

As ASC completes this cycle of C-FUSA, improvements will be made to the process. More importantly, organizational leadership is becoming energized by our USA process. Improvements will occur, and when the IG next visits— ASC will be ready.

SCHEDULING ISSUES
(For 25 July 96)

AFQI INTERVENTION LOG 21-25 July 96

Login	Unit	MAJCOM	Request	Dates	Location	Status	Disposition
29-Apr	AMC/SG	AMC	Facilitating Strategic Planning Course		Scott AFB, MO	POC: Capt Johnson	Pending
28-May		Civilian	Invited to speak at Internation Convention for AQP	29-30 Oct	Belgium	Presentation on the topic of Training to an International Group	Pending
						More info to follow POC: Maj Glasgow	
17-Jun	31FW	USAFE	USA and QA training	Nov	Aviano, Itialy	TL: Ms Moore TM: Capt Dubroff	Approved
3-Jul	37 TRW/XPQ	AETC	Tailored USA training	last wk Oct	Lackland AFB, TX	15-20 SNCO and Field Grad Officers	Pending
24-Jul	AWC	AETC	Overview of the Groupware Tools for Strat Planning	17 & 20 Sep	Maxwell AFB. AL	Possilble TL: Capt Block	Pending

UPDATED: 24 July 96

"Innovative Technology"
Dover Air Force Base's
Solution To Environmental Restoration

Maj James W. Mills

Environmental Flight Commander, 436 Civil Engineering Squadron, Dover Air Force Base, Delaware. Maj Mills supervises a staff of 17; oversees $8M environmental budget. He directs Base Installation Restoration Program including monitoring 59 sites and also directs the Environmental Compliance Program; manages industrial waste, sewer and storm water, as well as all asbestos and lead paint issues. He has implemented pollution prevention and recycling programs including curbside recycling, wash recycling systems, paint recycling, and removal of all hazardous waste. He is a Senior Navigator with over 3600 flying hours in the C-5B, T-43A, C-130H, and C-130E aircraft.

"Innovative Technology" Dover Air Force Base's Solution To Environmental Restoration

Maj James W. Mills
436 SPTG/CEV, Dover Air Force Base, Delaware

Abstract

Dover, like many military installations, has significant environmental contamination from military operations and past waste disposal practices. The Base has an on-going environmental restoration program whose purpose is to identify, quantify, and remediate environmental problems caused by these past hazardous waste management practices. To date, 59 individual sites have been identified as hazardous or potentially hazardous sites at Dover Air Force Base. The goal of the environmental restoration program is to investigate contaminated sites, evaluate the feasibility of remedial alternatives, and remediate contamination that poses a risk to human health and the environment.

Partnering with environmental contractors, private industries, federal and state regulatory agencies, and other government agencies, Dover has integrated a number of innovative technologies into its environmental restoration program. The inclusion of these innovative technologies will not only facilitate the clean-up of contamination at Dover, but will also aid in the development of improved, less costly clean-up technologies which can be used globally for environmental restoration.

The environmental restoration program activities and studies currently on-going at Dover Air Force Base include the following:

- A Basewide Remedial Investigation

- Remedial Design for Bioslurping Systems to recover free floating petroleum from the groundwater table at 4 environmental restoration program sites

- Remedial Actions including the application of innovative technologies at 3 locations with chlorinated solvent contamination in the groundwater

- Characterization of a soil source contaminated with pesticides

- Operation of an Aquifer Air Sparging/Soil Vapor Extraction System

- Long Term Monitoring and Natural Attenuation Projects

- National Test Site

Basewide Remedial Investigation

The focus of the Dover Remedial Investigation was to identify potential source areas of contamination and to delineate constituent migration within soils and the Columbia Aquifer. The Columbia Aquifer is the groundwater aquifer under Dover which is closest to the ground surface. DAMES and MOORE, the prime contractor for the Remedial Investigation work, conducted a field investigation during which 236 monitoring wells were installed, 156 soil borings were drilled, 21 test pits were excavated, and soil, groundwater, surface water, and sediment samples were collected and analyzed. Additionally, field screening activities, including soil gas surveys, geophysical surveys, and groundwater probe sampling, were completed. The Remedial Investigation Report, which summarizes the field investigation results, is currently undergoing review.

The data gathered during the Basewide Remedial Investigation are the foundation on which further environmental restoration program decisions and actions are based. The remedial design activities and innovative technology work currently on-going at Dover Air Force Base, built on these data results, are discussed in the following paragraphs.

## Remedial Design For Bioslurping Systems

Remedial design activities for Bioslurping Systems are currently underway for four petroleum contaminated sites. Dover accelerated clean-up of these sites using the Petroleum Exclusion Clause under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). In August of 1995, Dover, in cooperation with the Air Force Center for Environmental Excellence (AFCEE) Technology Transfer Division, tested the Bioslurping Technology at a site contaminated with petroleum from a fuel line leak. Bioslurping, also known as Vacuum-Mediated Free Product Recovery/Bioremediation, is applicable to sites where light nonaqueous phase liquids (LNAPLs) (e.g. petroleum hydrocarbons) form a measurable layer of free-floating product on the groundwater table. This technology can simultaneously remove the free-floating petroleum product and treat the surrounding soil.

242

A bioslurping system consists of a slurp tube that extends into the free petroleum layer in a well. The petroleum is drawn into the tube using a vacuum extraction pump. In addition, as the vacuum extracts vapor from the subsurface, air is pulled through the soil promoting aerobic biodegradation (also known as bioventing). A minimal amount of groundwater is also extracted with the petroleum product. The liquid stream extracted from the bioslurper well flows to an oil/water separator and vapor discharge/treatment point.

The August 1995 Bioslurping demonstration at Dover recovered an average of approximately 50 gallons per day of petroleum product, as compared to 2 gallons per day using a solar powered skimmer. Due to the success of this demonstration, Dover is incorporating the Bioslurping Technology into remedial design and corrective action plans for four petroleum contaminated sites.

Bioslurping Technology Demonstration

243
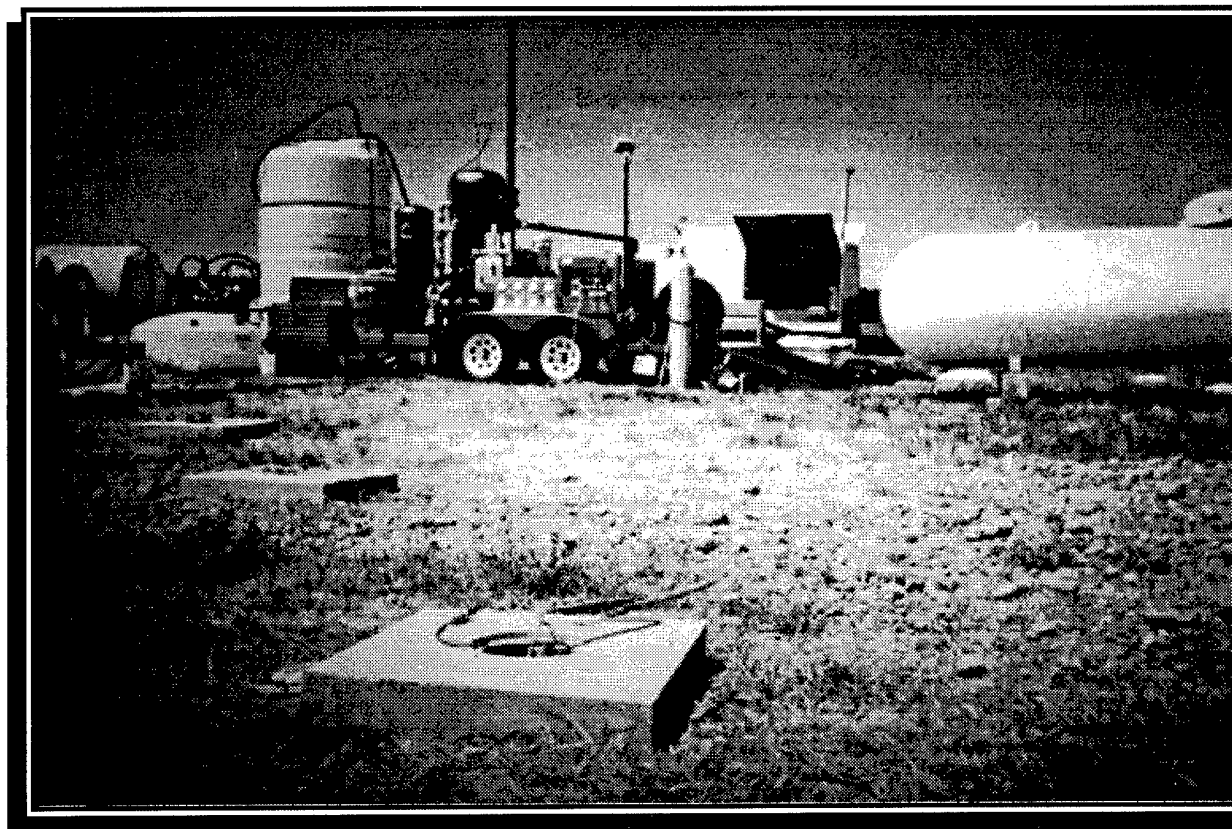
Full View of Bioslurping Site

Remedial Actions: Innovative Technologies At 3 Source Areas

During the Basewide Remedial Investigation, significant areas of chlorinated solvent (e.g. trichloroethene) groundwater contamination were identified. A large chlorinated solvent groundwater plume, shown in Figure 1, originates from sources in the industrial area of the Base.

There is wide interest among both government and private industries in developing technologies to degrade chlorinated solvents in soils and groundwater. As a result of the data obtained during the Basewide Remedial Investigation, the Remediation Technologies Development Forum (RTDF) became interested in using Dover as a site for testing and evaluating the effectiveness of in-situ bioremediation processes for degrading chlorinated solvents. RTDF is a consortium of partners from private industry and government whose purpose is to develop cost-effective remediation processes. RTDF's industrial partners include DuPont, Dow, General Electric, Monsanto, Zeneca, and Ciba-Geigy; the government representatives include the Environmental Protection Agency and the Department of

244

Energy. RTDF will evaluate three in-situ bioremediation processes for degrading chlori-
nated solvents at Dover. They are Natural Attenuation, Accelerated Anaerobic Degrada-
tion, and Co-metabolic Bioventing. Dover integrated these RTDF evaluations into its
environmental restoration program. Records of Decision were generated for three source
areas, including natural attenuation, accelerated anaerobic degradation, and co-metabolic
bioventing technologies as the interim remedial actions for these sites. Integration of the
RTDF work with the environmental restoration program allows Dover to accelerate the
clean-up of chlorinated solvent groundwater contamination. At the same time, Dover is
aiding RTDF with the development of in-situ bioremediation technologies which have the
potential for global application.

The first of these in-situ bioremediation processes, Natural Attenuation, is the natural
degradation of chlorinated solvents in groundwater by indigenous microbial populations
and geochemical processes. Certain microorganisms are capable of dechlorinating chlori-
nated organic compounds by reductive dehalogenation. This process occurs under anaero-
bic conditions and can result in complete dechlorination to innocuous end products such as
methane, ethylene, or ethane. The objective of the Natural Attenuation research effort is to
quantitatively determine where, at what rate, and under what conditions natural attenuation
will occur. This data can then be used to make predictions of the ultimate fate of contamina-
tion at the site under natural conditions. Dover is known to have an active microbial popu-
lation and appropriate geochemical environment as evidenced by the presence of degrada-
tion products in the groundwater.

Second, if natural degradation is occurring at certain sites, then it may be possible to
accelerate the process by engineering the delivery of nutrients, and controlling groundwater
movement. The rate of in-situ anaerobic dechlorination is typically limited by the availabil-
ity of nutrients for microbial growth. The purpose of Accelerated Anaerobic Degradation is
to discover what these nutritional limitations are and to effectively deliver the nutritional
additions to the groundwater aquifer.

The third innovative technology to be applied to chlorinated solvent contamination at
Dover Air Force Base is Co-metabolic Bioventing. Laboratory studies have shown that
aerobic degradation of trichloroethene (TCE) in soils occurs most easily in the presence of a
cometabolite, such as toluene or methane. Many TCE-contaminated soils also contain fuels
which allow for cometabolism of the TCE due to the presence of toluene and possibly other
cometabolites in the fuel. Bioventing methods deliver oxygen very efficiently to the vadose
zone, the unsaturated soil above the groundwater table. The use of bioventing to supply
oxygen to the vadose zone for co-metabolic biodegradation of TCE and fuel appears to
have great promise. The RTDF objective is to develop a cost-effective bioventing process
that promotes the Co-metabolic bioremediation of fuel and TCE in contaminated soils at
Dover.

245

Characterization Of Pesticide Soil Source

Groundwater contamination data collected during the Basewide Remedial Investigation indicated the possibility of a pesticide soil source in the industrial area of the Base. The Hazardous Waste Remedial Actions Program (HAZWRAP), which is managed by Lockheed Marietta for the Department of Energy, is working for Dover Air Force Base to characterize this source. HAZWRAP and Dover have developed a sampling grid to cover the suspected source area. Soil sampling is on-going, and determination of the nature and extent of the contamination is pending laboratory results. Dover will evaluate remedial alternatives when the site characterization is complete.

Soil Sampling in Lindane Source Area

Aquifer Air Sparging/Soil Vapor Extraction System

As part of the remedy for clean-up of former industrial waste lagoons, Dover Air Force Base operates an Aquifer Air Sparging/Soil Vapor Extraction System in the industrial area of the Base. Air sparging is an innovative treatment technology that injects air into the saturated zone (that part of the subsurface that is saturated with ground water) to remove hazardous contaminants. The air is injected below the contaminated area, forming bubbles that rise and carry trapped and dissolved contaminants into the unsaturated zone (that part of the subsurface located above the ground water). Through a subsequent treatment technology, soil vapor extraction, the contaminants are removed and treated as necessary. Soil vapor extraction technology uses a vacuum to draw air through the unsaturated zone to vaporize the volatile organic compounds in the soil. Since air sparging effectively moves the contaminants upward into the unsaturated zone, this technology is typically used in conjunction with soil vapor extraction.

Figure 2 shows a schematic diagram of the air sparging process. The process begins by installing air injection wells into the groundwater below the contaminants. An air compressor is used to force air down the injection well and out through a screened opening, causing bubbles to form. The bubbles move upward and outward. The bubbles dislodge trapped contaminants, vaporize dissolved contaminants, and carry them up to the unsaturated zone. As the volatile organic compound vapors reach the unsaturated zone, they are pulled into vapor extraction wells that are screened in this zone. The air sparging treatment process is designed and operated in conjunction with the soil vapor extraction system to ensure that volatile organic compounds are properly removed to the surface for treatment.
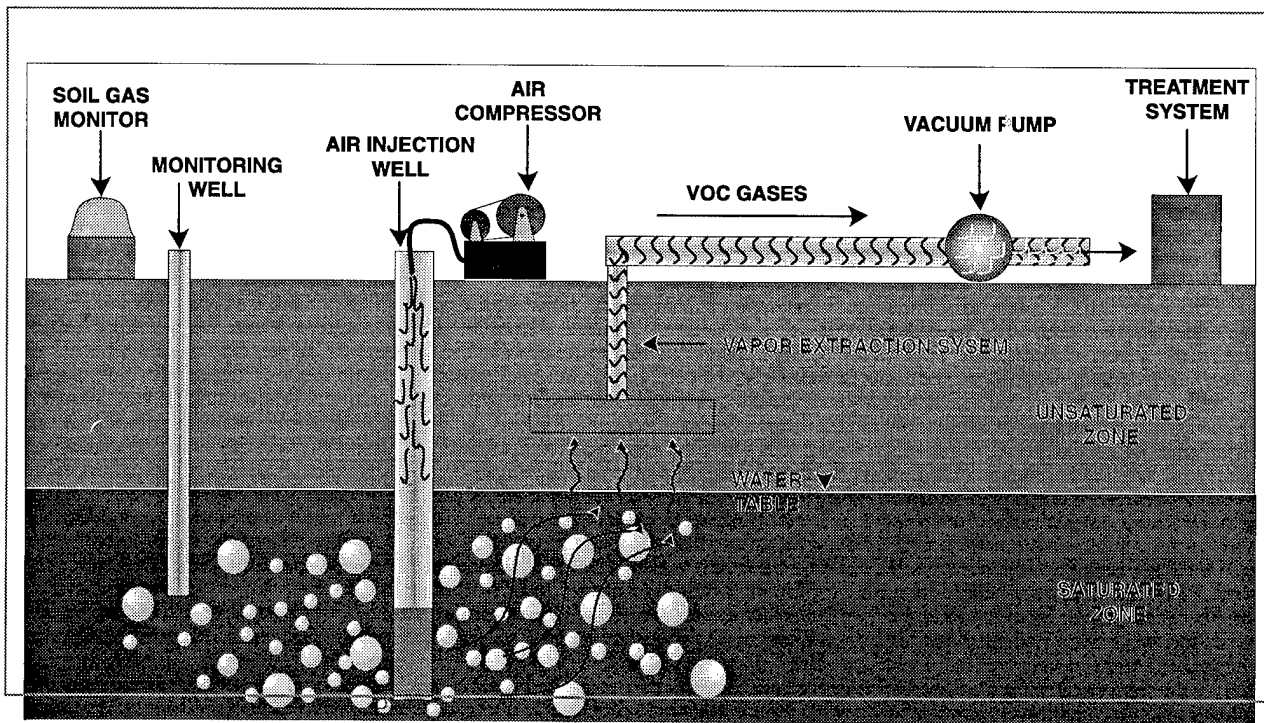

Figure 2: Cross-Section of an Air Sparging/Soil Vapor Extraction System

Long Term Monitoring And Natural Attenuation Projects

Dover is currently in the process of developing a well network for long term monitoring of groundwater. The purpose of long term monitoring is to verify that the corrective actions implemented at Dover effectively remediate contamination, and to detect and prevent residual contaminants from migrating off Base. The United States Geological Survey (USGS) is currently under contract to evaluate existing wells to determine if there are any improperly constructed or damaged wells that might impact the quality of groundwater at Dover. The objective of the project is to create a groundwater flow model which will be used to determine which wells will be used in the long term monitoring well network. The long term monitoring well network will be used to monitor groundwater contamination at Dover for several decades.

In addition to the long term monitoring project, the USGS is also evaluating natural attenuation processes at Dover. The purpose of the USGS natural attenuation project is to obtain chemical and modeling data to determine if this technology is adequate to remediate existing contaminants. This involves determining if contaminants are naturally attenuating at rates adequate to prevent risk to human health and the environment. The USGS is currently taking groundwater and surface water samples for chemical data analysis. Computer modeling will be used to characterize geochemical processes at contaminated source areas and to determine natural attenuation rates.

National Test Site

The Strategic Environmental Research and Development Program (SERDP) is a congressionally-sponsored program whose aim is to focus research and development efforts on current environmental challenges. Dover Air Force Base was chosen by SERDP as the national test site for research focusing on dense nonaqueous phase liquid (DNAPL) contamination in shallow aquifers. A Groundwater Remediation Field Laboratory (GRFL) is planned for Dover, and will include an in-situ, contained release facility. Figure 3 shows a conceptual drawing of a GRFL contained release cell. This facility will provide a location where research can be conducted on the transport of contamination in groundwater, and where remediation technologies for contamination in soil and groundwater can be demonstrated. The goal of the program is to demonstrate remediation technologies under realistic, representative field conditions, with predeveloped Quality Assurance/Quality Control procedures and test protocols, that will promote field acceptance of the technologies.

By developing working partnerships with private industry, regulatory agencies, and other government agencies, and by aggressively pursuing remedial alternatives, Dover Air Force Base has taken a leading role in Air Force environmental restoration, setting the example for others to follow.

Customer Focus And Satisfaction:
A Systems Approach At The Wing-Level

Lt Col Francis E. McIntire (Ret)

Lt Col Francis E. McIntire served as the Deputy Director, Headquarters Air Force Space Command and Deputy Commander, Air Force Quality Institute. He champions a systems approach for the implementation of Quality Air Force. Highlights include the Education and Training Architecture, an integrated processes for strategic planning and Unit Self Assessment, customer focus and satisfaction, rewards and recognition, and an integrated training plan. Consultant to Air Force senior leadership.
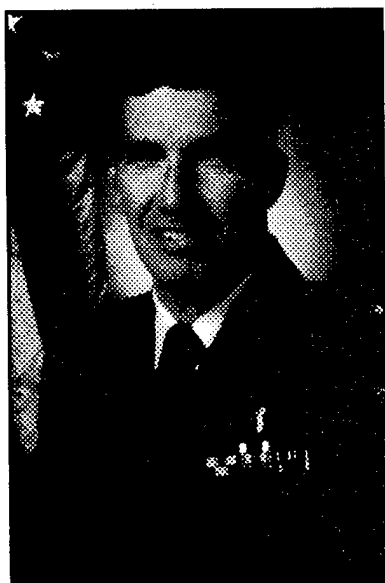
Lt Col Albert A. Hartzell   Ms Esther M. Krowel
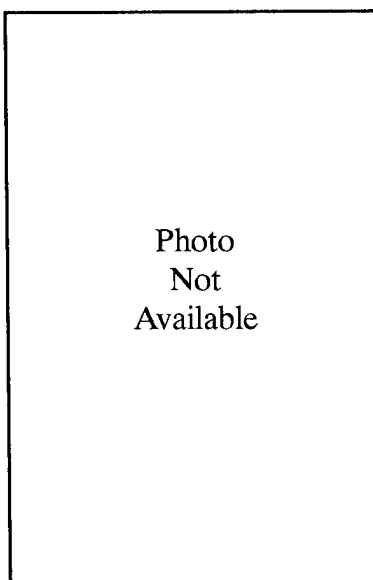
Lieutenant Colonel Albert A. Hartzell is the commander of the 21st Aerospace Medicine Squadron, Peterson Air Force base, Colo. The colonel received his direct commission in 1974. He entered active duty in June 1975. The majority of his career has been associated with the Aerospace Physiology career field. He has risen in the career field from staff aerospace physiologist to command coordinator for Air Force Space Command. He is a board certified physiologist.

Ms Krowel is the 21st Support Group Quality Advisor, Peterson AFB, Colorado. She was one of the 21st Space Wing original Quality Trainers and the Director for Adjunct Instructor's program. She received her M.Ed. from the Citadel and B.A. from Auburn University. Ten years of government service are highlighted by involvement in GSU training and work center integration of the QAF principals. Currently, she is working on systemizing a customer importance/satisfaction model for the 21st Space Wing and the creation of a systemic metrics indices for Support Group processes.

Customer Focus And Satisfaction:
A Systems Approach At The Wing-Level

Lt Col Francis E. McIntire, USAF (Ret.)
Ms Esther Krowel,
Lt Col Al Hartzell, USAF, BSC
Peterson AFB, CO

Abstract

Command-wide measurement tool requires: Broad-based leadership support, cross-functional application, consistent use of QAF Criteria (QAFA, USA), a simple to use survey format, the support of Command-wide initiatives, decision making methodology (data-based), and a catalyst for Cross Tell. Considerations during prototype development include: the establishment of metrics (to support QPMs, functional indicators), a method of data collection, a method of data distribution, and the development of a manual system first, automation comes later. Should prototype be met with leadership support the next steps should follow: field test, analysis, deploy survey to field, up-channel results, and solicit feedback. This paper presents the aforementioned methodology applied to the 21st Space Wing, Peterson Air Force Base, Colorado. The nature of this success is noteworthy and will serve as a guidepost to future innovation at the wing-level.

Discussion

Background: the quality Air Force Assessment methodology used by the IG will assess the unit's Customer Focus and Satisfaction initiatives. This is heavily weighted: a full 25% of the 1000 points are allotted to Customer Satisfaction. Additionally, Air Force Space Command QAFA methodology includes the Space Inspection Guide (SIG) titled "The Quality Way" and includes Customer Focus and Satisfaction as the premiere element of five. Additionally the SIG requires that all organizations identify customer requirements, conduct frequent reviews of customer satisfaction data, deploy the same, and make customer feedback routine.

Systematic Approach

The time is right for a command-wide initiative to measure customer focus and satisfaction at the wing-level. Commanders will benefit greatly from the survey-based method for gauging customer satisfaction across the functional areas of their groups. Using the medical arena (patient services), higher education (student services), and U.S. Army posts (garrison-level) as benchmarks, the command found that the wing-level and particularly the Support

251

Group arena is exactly where our major emphasis needs to be in measuring and improving customer satisfaction. HQ AFSPC role is to provide alignment to ensure that successes are meaningful, can be communicated between wings, and Support Group commanders can gauge satisfaction levels across functional boundaries. To this end, HQ AFSPC/QI has developed a customer focus and satisfaction methodology to export to the wings command-wide.

Methodology

Based on a hybrid of what works well at the functional areas and includes a survey tool which has gained consensus for use across one wing within the command. (Sample survey at Figure 1) When integrating a Customer Focus and Satisfaction system, remember: "The main thing is to keep the main thing the main thing" — Dr. Steven Covey. And, a definition of customer focus and satisfaction: "Customers' perception that their expectations have been met or surpassed." — Dr Dick Gerson. The system begins with the customers' definition of quality. Air Force Space Command's objective is to develop a framework which serves the following system needs:

1. Identify factors which define customer satisfaction.

2. Measures the presence of these factors.

3. Increases the presence of these factors.

4. Links customer satisfaction to organizational performance (results)..at the wing-level.

The objective for private industry is to produce a satisfied and loyal customer who will stay with you over time. This presupposes an operational definition and defines satisfaction in terms of behavior. It is important to recognize that what gets measured gets done. So the identification of factors and the measurement of those factors must relate to occurrences that are defined by a quantifiable number or measure, are connected with supplier's behavior, and ostensibly, link employee's behavior to organizational results.

In the global sense quality is "someone who is helpful" (helpfulness), "someone who is friendly" (friendliness) "I get what I ask for" (fitness for use), and "improvement through feedback". To provide a mid-course summary: customer satisfaction is whatever the customer perceives as quality, not what the supplier says that it is. Quality is whatever the customer says that it is.

252

Recommended Approach

Four steps to implementing a systematic approach to customer focus and satisfaction will include the following.

- First, find out how the customer defines "quality" and "satisfaction" in terms of observable (behavioral) factors
- Second, build a measurement system to quantify these observable factors
- Third, develop a mechanism to increase the presence of these factors
- Finally, establish correlation between these factors and organizational performance

QUALITY IS...

WHATEVER THE CUSTOMER SAYS IT IS

NOT WHAT THE SUPPLIER SAYS IT IS

PERCEPTION: EXPECTATIONS HAVE BEEN MET

MEASURE WHAT'S IMPORTANT TO THE CUSTOMER

The Foundation

For the first (and most important) element: find out how the customer defines "quality" and "satisfaction". This action is obvious but not natural. Unless an organization steps up to a system-wide approach to customer focus and satisfaction, they will probably never consider what the customer requires, much less ask the customer base for a definition of quality and satisfactions. Effective methods of establishing the customer's definition include a survey form (Figure 1) which is typically both closed and open-ended. Surveys are like models; all are wrong, but some are useful. The template shown at Figure 1 was developed for use by one Support Group within Air Force Space Command and offered for export to remaining units within the command. The impetus for its development was a need on the part of senior leadership to establish a vehicle to measure satisfaction across the functional boundaries within the Support Group. The open-ended nature of this tool would allow it to be used to identify customer requirements and definitions of "quality" and "satisfaction". Senior leadership can consider fora such as Quality Focus Day or Customer Focus Day to invite base or functional area-wide feedback from customers. The most sophisticated organizations will include data collected from internal and external customers. To successfully identify those observable (behavioral) factors that relate to "quality" and "satisfaction", requires interpretation. Dr. Deming stated that the vast majority of the business at hand is based in human nature. As such we must understand that we often employ a self-serving bias when attributing behavior to results. It is often tempting to link well intentioned activity or behavior to positive results, while at the same time dismissing unfavorable results to special or unassignable cause. A systematic approach allows the customer to

253

define in behavioral terms the essence of "quality" and "satisfaction". This eliminates misinterpretation based on good intentions and misunderstanding.

Building on the Foundation

Once the behavioral factors are identified the second step is to build a measurement system to quantify these observable factors. The data presented in Figures 2 through 5 are examples of dissimilar functions that are normalized using a spreadsheet table. Once the empirical data is collected, measures of central tendency can be calculated and frequency distributions may be established. Organizations fortunate enough to have historical data available can establish historical baselines for future comparison.

The third step is to increase the presence of these factors identified in the first stage and quantified in the second. Success is achieved by continually asking customers to define "quality". There is no presupposition that customer definition of quality will remain constant. Additionally, the factors identified must be continually measured. Once these measures are in place comes the requirement to educate employees (increase their level of knowledge from the customer's perspective). Next, the requirement to establish cause and effect relationships so that employees understand what drives the customers' choices. Positive behaviors which equate to higher levels of customer satisfaction are transferred to employees, must be demonstrated internally and externally, and must become the basis for employee feedback, recognition, and reward.

Once these mechanisms are in place the fourth step is to establish correlation between these factors and organizational performance. This is more elusive than establishing links between supplier and customer behaviors. A number of factors influencing organizational performance are highly elastic and dependent on the environment within which the organization operates. One example of this elasticity is evident in recent history. Although the Wallace Company achieved enviable levels of customer satisfaction, the change of management relative to their corporate debt and certain tangential events which lead to the loss of capitalization had a serious impact on the company's liquidity. The emphasis on a systematic approach will not protect the organization from outside forces that impact all systems within the environment. A well integrated system will prove more robust that its process-focused counterparts. Senior leadership attributes Wallace Company's ability to "enjoy" the recession of the early nineties as evidence that survival is not compulsory but possible in light of what would otherwise be overwhelming odds.

Leadership, Values, Culture, and Results

The culture and environment which will support this leading-edge initiative is characterized by the following elements: broad-based leadership support, cross-functional application, consistent use of QAF Criteria (QAFA, USA), simple-to-use survey format, support of Command-wide initiatives, decision making (data-based), catalyst for Cross Tell. Considerations during prototype development will include: establishment of metric (to support

QPMs, functional indicators), method of data collection, method of data distribution, manual system first and automate later.

The fundamental impetus for seeking and achieving higher levels of customer focus and satisfaction will always be results. Within the military context results must always relate to mission accomplishment. Once again the tendency to attribute mission success to good intentions is alive and well. The system-based approach to customer focus and satisfaction offers the opportunity to establish hypotheses based on documentable and observable occurrences. Theories can be established in the planning stages and inferences drawn once data is gathered. Basic and management tools will prove useful in illustrating the unseen forces. In many cases correlation can be established in the absence of causal links. Examples: scatter diagrams to illustrate correlation, Taguchi Loss Function and Activity Based Costing to validate best balance of customer, supplier, and total cost, and QAF Criteria (Category 7) as the framework for assessment and improvement.

Leadership as the premiere driver can never be overstated. It remains the commander's responsibility to set parameters for the system. Effective leadership means good management of resources to achieve objectives and improve mission performance. A minimal approach to surveys does not suggest their elimination, only the subordination of surveys to data collection, and the subordination of that to the establishment of a hypothesis. Surveys are valuable to the extent that they support leadership objectives. The commander's emphasis is on action (which included analysis of data) and feedback to all levels of supervision, internal, and external customers. Senior leadership will always be accountable for results.

Conclusion

A command-wide customer focus and satisfaction initiative requires broad-based leadership support, cross-functional application, consistent use of QAF Criteria (QAFA, USA), simple to use survey format, support of Command-wide initiatives, decision making (data-based), and is a catalyst for cross tell. Considerations during prototype development include the establishment of metrics (to support QPMs, functional indicators), an agreed upon method of data collection, a reliable method of data distribution, and strong advice to use a manual system first with automation to follow.

Should the prototype initiative be met with leadership support the following should occur: Field test, analysis, deploy methodology to the field, up-channel results, and solicit feedback. Compilation of individual unit results can form a command-wide baseline for future endeavors.

SUPPORT GROUP
CUSTOMER SERVICE FEEDBACK

Section Visited: _____

Person Contacted: _____

Product or Service: _____

Date: _____ Time: _____

5=The Best, **4**=Very Good, **3**=Satisfactory, **2**=Poor, **1**=The Worst

How would you rate our:

Courtesy	**5**	**4**	**3**	**2**	**1**
Knowledge	**5**	**4**	**3**	**2**	**1**
Appearance of Personnel	**5**	**4**	**3**	**2**	**1**
Promptness of Service	**5**	**4**	**3**	**2**	**1**
Quality of Product/Service	**5**	**4**	**3**	**2**	**1**
Fulfillment of Expectation	**5**	**4**	**3**	**2**	**1**

Comments _____

_____

_____

_____

_____

Rank/Name _____
(Optional)

Organization _____ Phone _____

May we follow up with a phone call?   Yes   No

Figure 1

21st Space Wing Support For People
Measurement Development

Health Index

% Tobacco Free	% Passing Cycle Test	% Meeting Wt Mgt Std	HRA Index #	Common Scale
100	100	100		10
96	96	99.6		9
92	92	99.2		8
88	88	98.8		7
84	84	98.4		6
80	80	98.0		5
76	76	97.6		4
72	72	97.2		3
68	68	96.8		2
64	65	96.4		1
60	60	96.0		0

	% Tobacco Free	% Passing Cycle Test	% Meeting Wt Mgt Std	HRA Index #	Common Scale
Scale Score	5	2	5		Wing
Weights	.4	.4	.2		Score
Score x Weight	2.0	.8	1.0		3.8

Figure 2

21st Space Wing Support For People
Measurement Development

Customer Service - Professional Issues

Finance Flight	Military Personnel	Legal Office Facility	Military Treatment Scale	Common
100	100	100	100	10
96	96	96	96	9
92	92	92	92	8
88	88	88	88	7
84	84	84	84	6
80	80	80	80	5
76	76	76	76	4
72	72	72	72	3
68	68	68	68	2
64	64	64	64	1
60	60	60	60	0

	Finance	Military Personnel Flight	Legal Office	Military Treatment Facility	Common Scale
Scale Score Weights					Wing Score
Score x Weight					

NOTE: Proposed deployment of new customer service survey program is Mar/Apr 96.
Mrs. Krowel will prepare a draft policy letter and deployment plan for 21 SW QC approval. These will apply to all Customer Service areas.

Figure 3

21st Space Wing Support For People
Measurement Development

Customer Service - Personal Issues

Family Services	Chapel	Fitness Center	Child Care Center Scale	Common
100	100	100	100	10
96	96	96	96	9
92	92	92	92	8
88	88	88	88	7
84	84	84	84	6
80	80	80	80	5
76	76	76	76	4
72	72	72	72	3
68	68	68	68	2
64	64	64	64	1
60	60	60	60	0

	Family Services	Chapel	Fitness Center	Child Care Center	Common Scale
Scale Score Weights					Wing Score
Score x Weight					

Figure 4

21st Space Wing Support For People
Measurement Development

Customer Service - Facilities

Dormitories	Housing	Lodging	Work Centers Scale	Common
100	100	100	100	10
96	96	96	96	9
92	92	92	92	8
88	88	88	88	7
84	84	84	84	6
80	80	80	80	5
76	76	76	76	4
72	72	72	72	3
68	68	68	68	2
64	64	64	64	1
60	60	60	60	0

	Dormitories	Housing	Lodging	Work Centers	Common Scale
Scale Score Weights					Wing Score
Score x Weight					

Figure 5

The Language Of Quality

Lt Col Francis E. McIntire (Ret)

Lt Col Francis E. McIntire served as the Deputy Director, Headquarters Air Force Space Command and Deputy Commander, Air Force Quality Institute. He champions a systems approach for the implementation of Quality Air Force. Highlights include the Education and Training Architecture, an integrated processes for strategic planning and Unit Self Assessment, customer focus and satisfaction, rewards and recognition, and an integrated training plan. Consultant to Air Force senior leadership.

The Language Of Quality

Lt Col Francis E. McIntire, USAF (Ret)
Peterson AFB, CO

Abstract

The field of cultural anthropology brings the understanding that the language is a very important element of human behavior. Although it is somewhat obvious that language impacts the way that we communicate, it is also a key factor in determining the way that we think. The cultural diversity of people groups around the globe is often explained in terms of history, geography, and other factors impacting behavior. It is the purpose of this paper to propose that in the psychological hierarchy of thoughts, feelings, and behavior the words used by a select group not only represents what we think, but also changes the way that we think. By examining the formal documents which reflect the performance of excellent organizations we can draw certain conclusions. First, there is a distinct language that we use in describing ourselves as we seek to improve our organization's ability to accomplish the mission and apply the principles and methods known as quality improvement. Secondly, we change the way we describe ourselves over time as we learn more about ourselves and adapt new strategies to better achieve our mission, goals, and objectives. Innovative use of technology (key word search) lends insight that may have previously gone unnoticed.

Discussion

Organizational culture can be approached from a variety of perspectives. In order to successfully analyze a system a framework must be established to capture what happened when, how that relates to and impacts the system, and what conclusions and inferences can be reasonably proposed. Fortunately, at the November 1996 meeting of the Air Force Quality Council, it was established that there would be a methodology established to assess the health of an organization using an established criteria. The baseline criteria selected was that of the Malcolm Baldrige National Quality Award. It was transformed into the Quality Air Force Criteria and became the standard for what would be known as the Unit Self Assessment (USA) and the Quality Air Force Assessment (QAFA). It is important to note that not all organizations approached the USA and QAFA in a similar manner. What was observed, however, was the integration of some form of quality assessment into the traditional Inspector General method for determining readiness. At the March 1996 meeting of the Air Force Quality Council it was proposed that the method of integrating USA and QAFA in Air Force Space Command and other major commands had considerable merit. The framework adopted for this research includes the QAFA methodology of a single

Major Command, a specified framework for positive comments relative to excellent performance and improvements, and the identification of 22 key descriptors otherwise known as the "language of quality".

Baseline

The baseline data was drawn from six top-performing unit QAFA reports during the late 1994 and early 1995 (fiscal) time frame. Electronic word search revealed 22 key words in two categories.

Greater-used words with aggregate frequency in parentheses included: program (316), train/ed/ing (185), manage/d/ing/ment (101), process/es (96), data/metric/s (92), PAT/team (78), customer (74), instructor (50), system (45), and plan (42). Lesser-used words, although still highly significant, included: leader/ship (27), problem/s (16), improve/ment (14), measure/d (13), goal/s (6), relationship (6), training plan (5), procedure (4), checklist (4), supplier (2), faculty (2), and values (2). The baseline language of quality is displayed in the bar chart portion of the frequency diagram. Each point on the x-axis represents one discreet word or a family of terms which are considered synonymous for the purpose of this study. The y-axis represents the frequency of occurrence. This data is referred to as 1995 data and is presented in a bar chart frequency diagram in Table 1.

Analysis

Contrasted with the baseline is the data from eleven organizations which hosted a QAFA, were determined to be exceptional, and was not included in the baseline sample. With the exception of one unit that was inspected during the baseline period, the contrast sample included units that hosted a QAFA in mid to late 1995 or 1996 and is characterized as a line chart frequency diagram. The exceptional unit contains valuable and interesting information, and is integrated with the 1996 line chart frequency diagram displayed in Table 1.

Recurring Themes

Two very noticeable trends are represented by "spikes" in the line chart. These characterize an extraordinary increase in the use of "improve" or "improvement" to a greater extent, and "procedure" to a lesser extent to characterize descriptions of exceptional units. There are other trends, though less noticeable, which will be discussed in the context of the individual units as they relate to the larger population.

Although difficult to quantify, there appears to be a remarkable correlation in the language of quality from the baseline sample to that consisting of other excellent units some of which hosted a QAFA more than one full year later. This similarity in language is evident in the individual unit data for the organization identified as SECAF Unit Award Nominee at Table 2. This particular unit is a stellar performer, was nominated by the major command for the Secretary of the Air Force Unit Quality Award, and received a site visit in February 1996. Very noticeable is the trend supporting the overall theme of dramatically increased
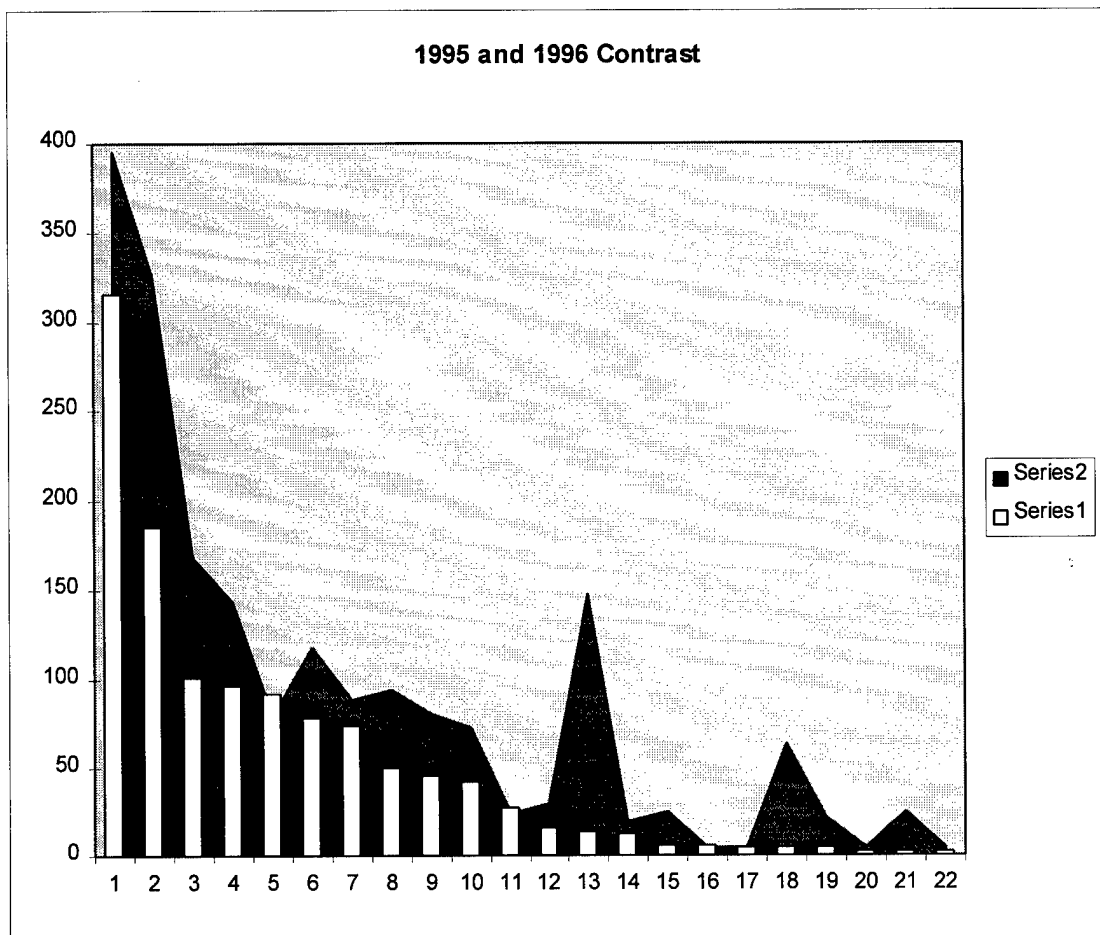
1995 and 1996 Contrast

Table 1

use of the word "improve" or "improvement" to a greater extent, and "procedure" and "plan" to a lesser extent. One of the more profound trends, however is masked by the spike in "improve/ment". That is a marked decrease in the use of the "leader" or "leadership". This trend, you will observe, is somewhat evident in Table 1, and will be a recurring negative theme throughout the analysis.

In spite of the previously mentioned spikes, the term that best characterizes the unit displayed in Table 2 is "balance". With the exception of the word "leader/ship" which was virtually absent in all cases but one, this organization was characterized by a very balanced use of the language of quality found in our baseline. This was not the case for most organizations.
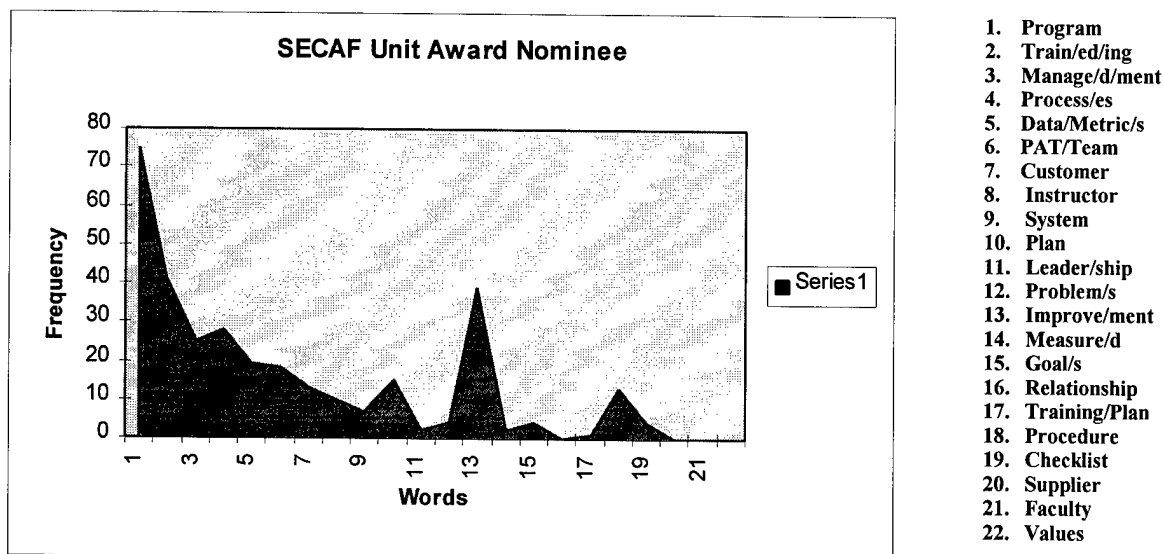
SECAF Unit Award Nominee

1. Program
2. Train/ed/ing
3. Manage/d/ment
4. Process/es
5. Data/Metric/s
6. PAT/Team
7. Customer
8. Instructor
9. System
10. Plan
11. Leader/ship
12. Problem/s
13. Improve/ment
14. Measure/d
15. Goal/s
16. Relationship
17. Training/Plan
18. Procedure
19. Checklist
20. Supplier
21. Faculty
22. Values

Table 2

With the framework for analysis established, we will continue to identify those units which support the over arching trends, while pointing out anomalies which offer perspective and insight regarding the language of quality.

Another phenomenon observed in a number of units included the sharp decrease in the use of "leader/ship" together with an equally sharp decrease in the use of 'data/metric/s", and a marked increase in the use of "improve/ment". This unusual and unexpected combination characterized the profiles of the organizations displayed in Tables 3, 4, and 5. Unique differences in these three are minimal indeed. The organization represented in Table 3 contributes to a sharp decrease in the 1996 use of "instructor" and the absence of some terms entirely. The idiosyncrasies of the organization represented in Table 4 include a marked reduction in a number of the baseline terms with the exception of "plan", "procedure", and "checklist". The organization represented in Table 5 was one of only three for which there was no reference to "goal/s". As a group, these three organizations demonstrate the typical variation seen in the use of the 22 term sets which comprise the language of quality.

We can offer that the sharp decrease in the use of "leader/ship" together with an equally sharp decrease in the use of 'data/metric/s", and a marked increase in the use of "improve/ment" is the prominent characteristic of the three organizations represented in Tables 3, 4, and 5.
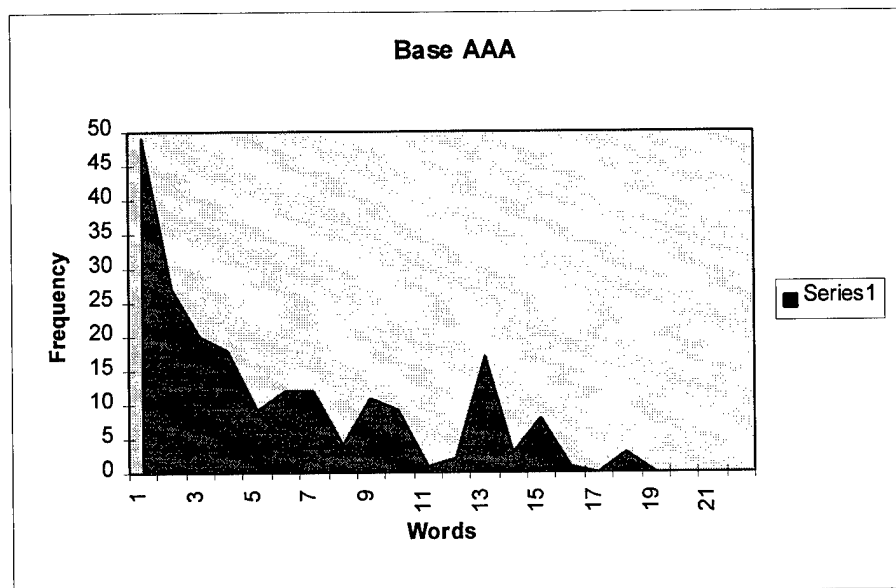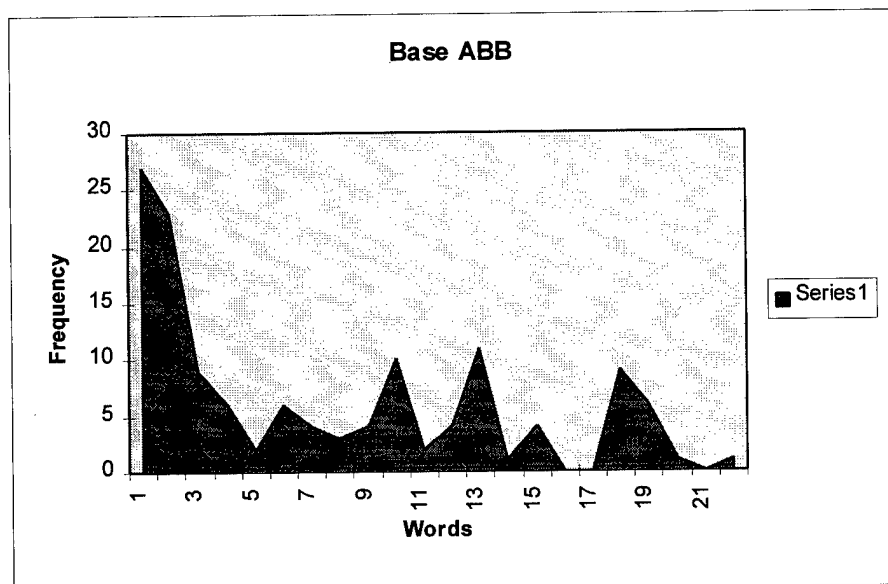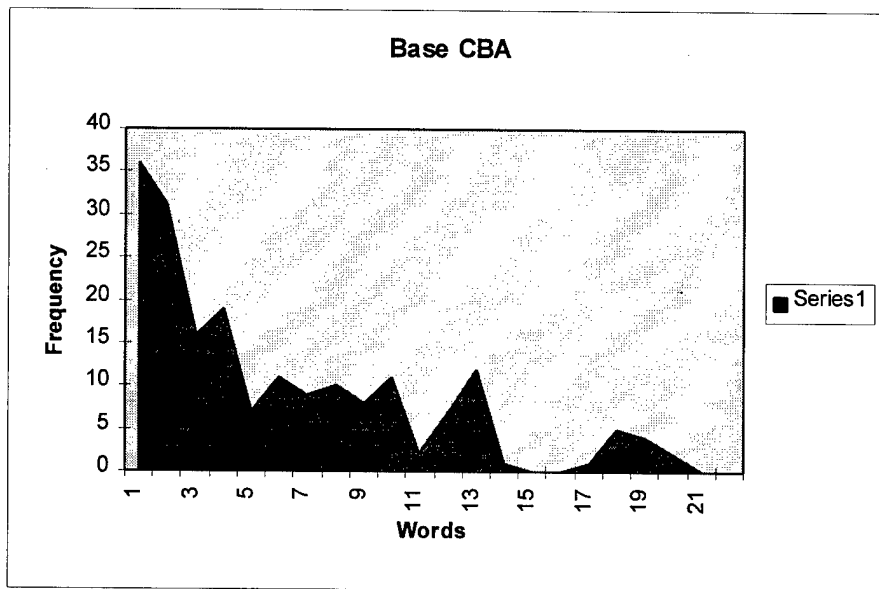
Table 3

Table 4

Table 5

The "Leader/ship" Anomaly

A close relative to the three organizations just mentioned is the one represented in Table 6. This organization shares a catastrophic drop in the use of "leader/ship" with no corresponding drop in the use of "data/metric/s" and no increase to the baseline use of "improvement". Another interesting feature of this organization is the characteristic sawtooth appearance which results from 14 of the 22 term sets referred to only once or not at all in the description of the unit. This is offset by a frequency of use for the remaining eight term sets to a rate very proportional to the baseline use in 1995.
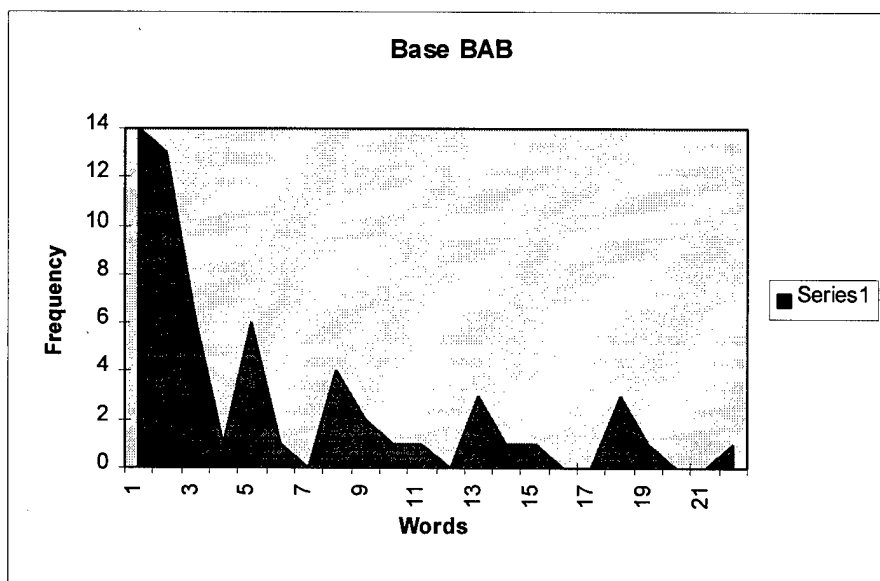

Table 6

267

This leadership anomaly (marked decline in the use of "leader/ship") is a theme which connects the majority of the organizations studied. In fact only two organizations reflected even a nominal use of the term set "leader/ship". The remainder saw only a minimal use of this important term. This phenomenon is evident in the SECAF Unit Award Nominee, Table 2 which is presented on page 4 and again here for the reader's convenience.

1. Program
2. Train/ed/ing
3. Manage/d/ment
4. Process/es
5. Data/Metric/s
6. PAT/Team
7. Customer
8. Instructor
9. System
10. Plan
11. Leader/ship
12. Problem/s
13. Improve/ment
14. Measure/d
15. Goal/s
16. Relationship
17. Training/Plan
18. Procedure
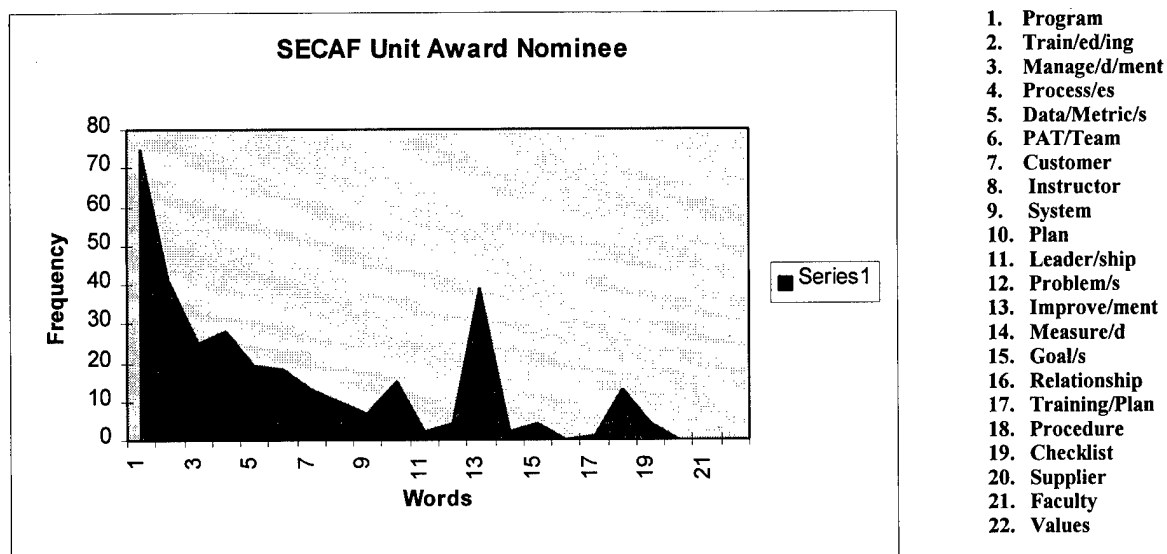19. Checklist
20. Supplier
21. Faculty
22. Values

Table 2 (repeat)

This important anomaly continues in the next two organizations to be examined. Here it merges with another very interesting phenomenon which directs a spotlight on what is considered the most unlikely term in the language of quality.

The "Program" Paradigm

In its earliest months of operation the Air Force Quality Institute promoted quality improvement as an initiative not a program. It was important to introduce quality improvement as a new way to accomplish the mission rather than a new activity that would be met with a high level of initial enthusiasm which would wane over time. It was generally accepted that a program would have established start and finish points. This makes "program" a poor description of an endeavor which would improve organizations and develop new leaders. In spite of the negative association given to the term "program" it appeared as the most frequently used term in the 1995 baseline study (aggregate) and in the 1996 data base (aggregate). To describe the term as most frequently used for 1995 is a gross understatement. In the 1995 baseline study, the term "program" appeared at a 40 percent greater frequency than the next most popular term set ("train/ed/ing"). In the 1996 study, "program" was still the most frequently used term in spite of a proportional decrease relative to the next most prominent term set (from more than 40 percent in 1995 to just over 15 percent

in 1996). It is also interesting to note that for three of the units comprising the 1996 aggregate, the prominence of the top terms is reversed. For these three organizations, the term set "train/ed/ing" is dominant to the term "program". The evidence for these reversals can be observed in Tables 7, 8, and 9.
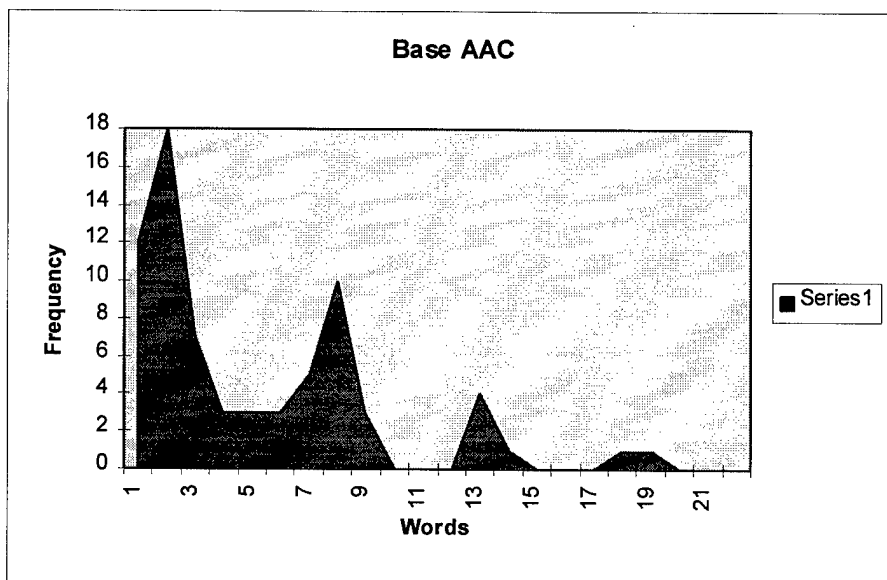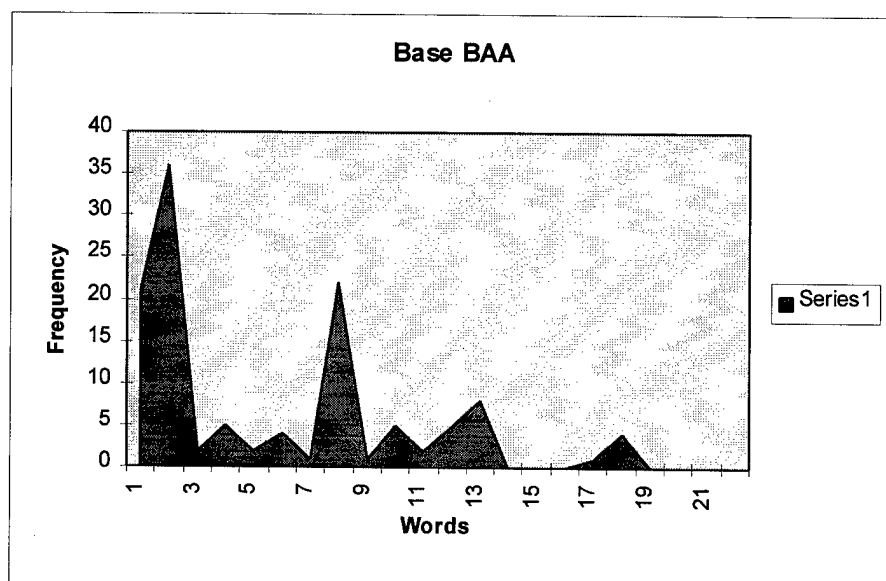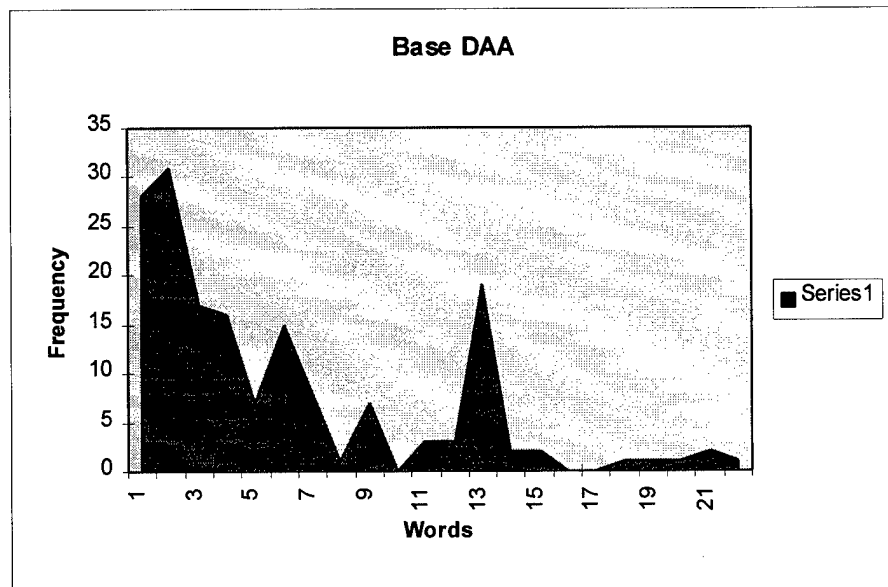

Table 7

Table 8

Table 9

The "program" paradigm presents itself as yet another prominent theme in the language of quality. This, with the reversal of prominence from "program" to "train/ed/ing" (Tables 7, 8 and 9) provides a very interesting perspective on the words that we use to describe the business of quality improvement in outstanding organizations.

It is also important to note that the leadership anomaly continues through the organizations represented in Tables 7, 8, and 9 to the extent that the term set "leader/ship" is completely absent in Table 7. Additionally, the organizations represented by Table 7 and all remaining, support the characteristic spike in the use of the term set "improve/ment" (seen in the 1996 data base) while reserving one or two unique features which will be described.

Both Table 9 and 10 show organizations that are characterized by a decrease in the use of the term set "data/metrics". Uniqueness is seen as Table 9 presents a limited use of "instructor", while Table 10 shows an increased use of "instructor" together with atypical prominence in the use of "PAT/team" and "customer".

Table 10 also had the highest occurrence of the terms "PAT/team" and "customer" for the 1996 data base. Use of "PAT/team" to describe the organization represented by Table 10 was 24 percent greater than the next most frequent usage. Use of "customer" was 41 percent greater than for the next most prominent.
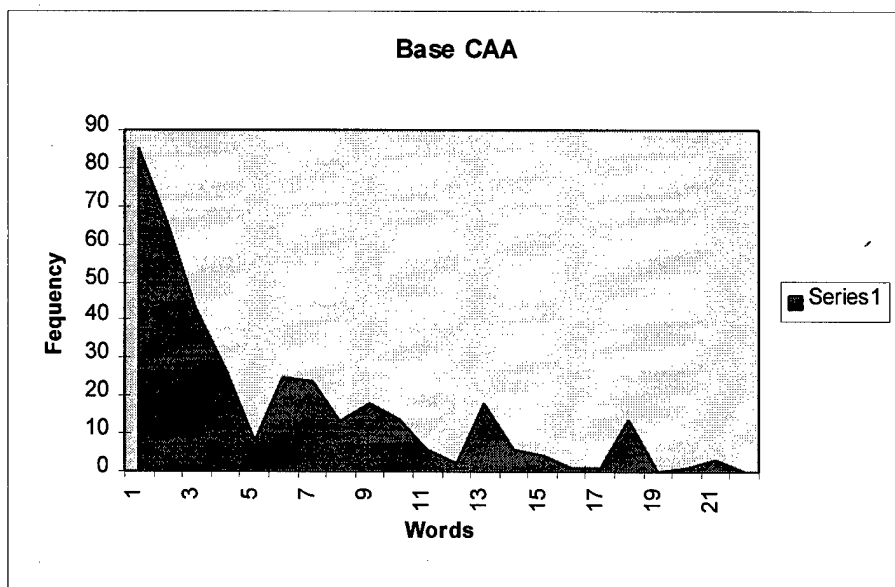
270

Base CAA

Table 10

The Rest of the Story

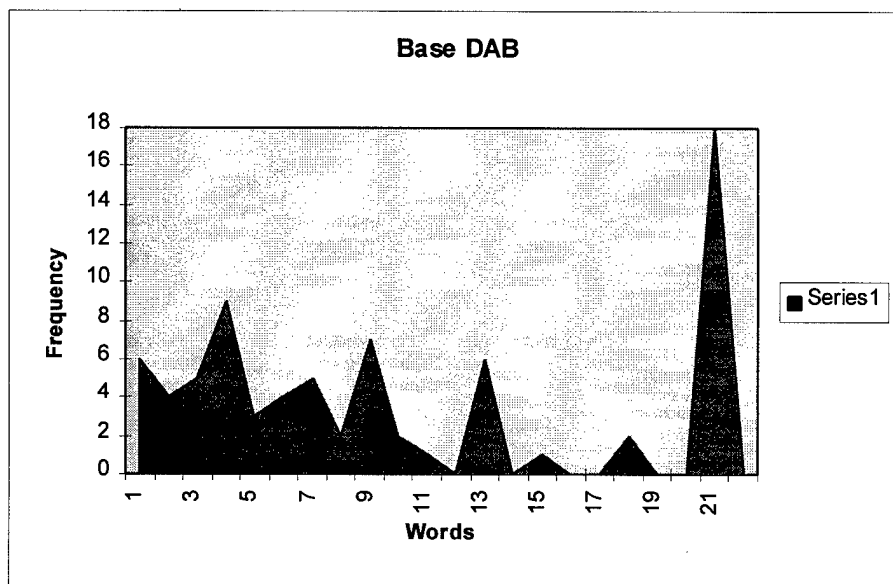The remaining two units present the familiar sawtooth appearance seen earlier. Both possess unique attributes as well.
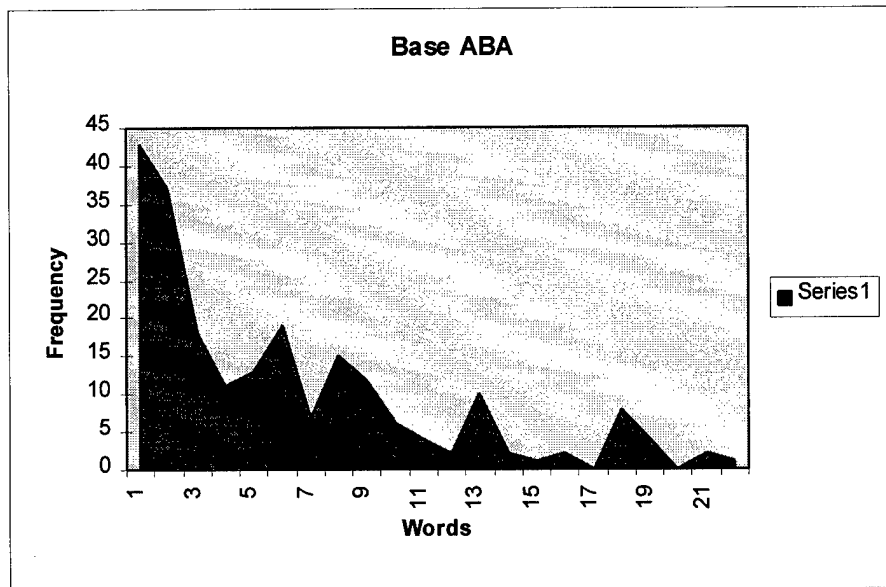

Base DAB

Table 11

Table 12

The organization represented in Table 11 presents an uncharacteristic decrease of the terms "program" and "train/ed/ing". This is offset by an unusually strong use of the terms "process/es" and "system", the now typical spike in the use of the term "improve/ment", and the uncharacteristic and extraordinary use of the term "faculty". The organization represented in Table 12 presents a proportionally very strong use of the terms "program" and "train/ed/ing" which are evidenced in both the 1995 baseline data and the 1996 aggregate reflected in Table 1. Modest peaks in Table 12 for the use of "improve/ment" and "procedure" also match those seen in the 1996 aggregate data (Table 1).

Conclusion

The importance of language in guiding the communication process cannot can be understated. Of equal importance are the cognitive links established based on the words that we use. These words include those that we use to describe our organizations as we seek to improve mission accomplishment through the application of the principles and methods of quality. These words also describe the change evident within organizations and the new strategies and methods adopted to better achieve mission, goals, and objectives. The themes are evident and tell us a great deal about ourselves. We eschew the term "program" in the quality improvement forum, but it is the most frequently used term in both aggregate data sets. Not surprising is the prominence of the term set "train/ed/ing". The most striking positive change in the way that the aggregate was described relates to the sharp increase in the term set "improve/ment" to a greater extent, and "procedure" to a lesser extent. The most significant negative change in the language of quality was the tremendous reduction in

the use of the term set "leader/ship" in virtually all cases, and described as the leadership anomaly. Leadership drives organizational improvement, the decreased term use would not suggest otherwise but cannot be overlooked. A thirst for knowledge and healthy curiosity about the status and changes impacting our organizations can be satisfied by the innovative use of current technology. Key word searches of electronic files can reveal evidence that we are clearly describing our organizations in ways that are consistent and may reflect the way that we think about organizations and organizational improvement.

Innovative Government Accountability:
Creating Your Own Accountability Agreement

Mr. Bruce Smith

Mr. Bruce Smith is currently serving in the quality area at Hill Air Force Base, Utah. He holds a master's degree in Organizational Communications, with an emphasis in leadership and quality. His articles are frequently published the *Hill Tops Times,* the base newspaper and in other AF publications. He has written and produced AF training and orientation films.

With a background of earning a teaching certificate and an excellent rating in the National Forensics League, he teaches in workshops and facilitates action teams in a garden variety of quality, strategic planning, systems understanding and productivity subjects. His main emphasis is to bring alive the "human dynamic" that is seldom understood or employed.

Innovative Government Accountability: Creating Your Own Accountability Agreement

Mr. Bruce Smith
Hill Air Force Base

Abstract

A melancholy wish has often crossed the minds of government managers and leaders. With a sigh, they say, "Gee, if we could only establish some kind of accountability in my area, most of my problems would be under control." Some managers energize themselves attempting to set up accountability only to fail nine times out of ten. As they seek long-lasting improvements, they come to realize that accountability is at the root of all improvements. They can't let go of the dream of having accountability, but making the dream come true seems to be just beyond their reach.

This paper reaffirms the need for accountability. It provides innovative tools, steps and examples of how it works and how to set it up for tangible results. Innovation is required to first establish accountability. Once established, accountability creates an environment wherein innovations can best flourish.

The Importance Of Accountability

General Viccellio has set forth a simple, but yet comprehensive framework for improvement. It is just as applicable to the individual as it is to the largest organization. By answering four questions an accountability agreement begins to take shape:

a) How are you doing?
b) How do you know?
c) How have you improved?
d) How do you know you have improved?

Many government employees are plopped into a job and become a cog in an enormously huge government wheel. The circumference of the wheel is so large and intimidating that they soon become content in the confinement of their own little niche. To improve, they become more and more entrenched in their job, unaware whether the improvements they're trying have a positive or negative impact down stream.

275

The basis of all accountability is in first knowing how your job is linked to the accepted/authorized mission. Without it, it is entirely possible to be extremely busy in your job, accomplish many things only to later learn that the work doesn't have anything to do with the overall mission. It is very liberating to know exactly what your job is, how it fits in, impacts and contributes to the whole. Once linked, accountability begins to grow.

Accountability is an agreement between employee and manager to accomplish certain results in exchange for mutually agreed upon compensation. Effective accountability gives full responsibility to the worker who, from time to time, renders an accounting for the results in measurable ways.

If accountability is administered well it has some outstanding side benefits. It provides data to create equitable appraisals and promotions. Clearer career paths can be followed. Ambiguity and frustration significantly decrease. Jobs well done surfaces to the top and can't go unnoticed for very long; they gets recognized. On the other hand, some employees and supervisors fear accountability because it reveals their meager contributions. With accountability, it's harder to hide.

Many claim that true accountability can't work in government because each job has too many variables and each person's work is so intertwined with others that it's impossible to separate what one person does from another. It is granted that government tasks are more difficult to measure than profit-making organizations, but they can, and should, be measured.

Because the links in government are not readily apparent, many employees and their supervisors don't even try to set up an accountable contract. Many are looking for tangible hitching posts to tie their accountability agreements to. For most government organizations, ideal hitching posts just don't, and won't ever, exist. So where do they come from? (This is where the beginnings of innovation start.)

Where do they come from? The answer is: *You just make them up; you create them.* They come out of your innovative head. This is a startling realization to most employees who have been breed to assume that all directives, including accountability agreements, must come in the form of regulations blessed by Congress itself.

You design your own measuring system that is right for you and your unit to measure your *own* results. To choose accountability is to choose an entrepreneurial spirit to create what *you* want. *You* choose it because *you* want it. Once you have created a successful accountability agreement, there is a temptation to make a *one-size-fits-all* pattern for other people and organizations. Let them copy the format, but not the content. They need to create their own.

To arrive at that contractual employee/manager agreement, a powerful, deep rooted mindset has to be overcome:

Mindset Change - From Large and Cumbersome to Small, Quick And Agile

Just before the Spanish Armada, Spain had amassed a fortune by their exploits in the New World. They invested most of it in a fleet of huge ships that they hoped would dominate the seas and secure even greater wealth. However, they had the mistaken mindset that the size of their ships would always have the upper hand. As it turned out the small, agile ships of the English maneuvered in, around and between and set them on fire. Spain never recovered from it.

Many in government today have a similar mindset. They have the idea that having huge ships (or organizations) is the way to go long distances on automatic pilot, and if anything goes awry they add more regulations to idiot proof the system.

Automatic pilot works fine when going from Spain to the Florida Key, but it won't work for a ship, a fighter aircraft or an organization where quick human judgement, intervention, complexity and dynamics maneuvering are needed. Successful organizations today prefer empowered, self-directed teams that are small, quick and agile able to act on rapidly shifting changes. Top-down decisions are too cumbersome and too slow to react. Todays working environment requires innovation, speed, agility and an understanding of how actions effect the whole system long term.

With personnel cuts and down sizing, the knee-jerk tendency is to consolidate. On the surface it seems logical to consolidate because it will prevent unnecessary duplication. As organizations and services come under one roof they get further away from the customer. Measurement and accountability are increasingly more difficult. Service becomes insulated and isolated. Although it starts with hopes of saving money and time, there is a tendency to build a bigger organization within it. People become more specialized more deeply "silo"ed in the job they do. The growing organization begins to collect too many managers that do busywork and require it of others because they are too far from the front line.

Overcoming the Mindset:

The most successful companies have small, self-directed, empowered work teams where everyone is fully involved. Without involvement, there is distrust, apathy and poor performance. With involvement, there is mutual cohesion, commitment and success. Innovations come from people who work at the front line where the battles are won. If truly empowered, they are free to create solutions and quickly react to the frantic pace of change.

Lee Iacocca realized this. In 1987, he admitted, "I wasn't using all my people to their fullest potential. I was deep in talent, but it was arranged in such (a way) that I couldn't get second-level people into the flow of things." He enjoyed great success by changing the management system to allow solutions to flow from the bottom up and he tapped into worker innovation and genius.

Innovation grows best in small self-directed work teams wherein each group makes its own decision, develops its own set of goals, charts its own course and creates its own results. Each of these eight steps are enlarged and explained on the next two pages.

Step Of An Accountability Agreement:

(1) List the things that you do.

(2) List the additional things that you should be doing to improve.

(3) Write how they link to, enhance, and support the team & mission.

(4) Create ways to measure, evaluate and quantify the tasks.

(5) Write down the consequences for doing them.

(6) Agree on needed resources.

(7) Create a score card.

(8) Evaluate accomplishments compared to a standard.

---

(1) List the things you do.

Don't write down every single step in each of your processes. On the other hand, don't simply write down a single verb of what you do - "I buy," or "I administer," or "I weld," or "I supervise," or "I inspect." It is best if this is first done individually. Otherwise, the intuitive person may never be heard and the lazy person may ride on the coat tails of the efforts of others. When it is later done as a team, it is absolutely critical for every team member to actively participate in it.

(2) List the additional things that you should be doing to improve.

There is always room for improvement and there are always those things that you wish you had time for. It is going beyond the basic requirements that makes the major difference.

(3) Write how they link to, enhance, and support the team, mission and customers.

This portion will be very enlightening and revealing. It will show how well or how poorly employees' tasks are supporting the mission. The process of discussing and writing this portion in long hand may surface hidden agendas and different priorities. Teams will use innovation to align more completely to the mission and their customers.

(4) Create ways to measure, evaluate and quantify the tasks.

Peter Drucker once wrote, "If you want it, measure it. If you can't measure it, forget it." There is a way to measure anything: widgets per shift, defect per parts produced, customer complaints per department, and the number of services rendered. These are quantitative. Qualitative should also be included, such as customer approval average rating, and content analysis of customer's comments. Most, if not all, of these measurements don't exist - you have to make them up.

(5) Write down the consequences for doing them.

At this point, employees and supervisors must come to mutual agreements of what happens if the employee does a good job and what happens if the employee does a poor job. Everything is negotiable, yet most government workers don't use enough creativity in considering their options. Somehow they feel that all of the consequences have been figured out and documented by Congress. There are many book published on creative ways of equitably and justly rewarding employees. Workers must learn from an old saying, "I bargained with life for a penny and life would pay no more." They, and their supervisor, should seek an agreement wherein both sides win. It requires innovation and creativity. Agreements like this have never been made before. If you don't create them, you'll never have what you want.

One consequence that many managers overlook is the power and impact of recognition. To be noticed, appreciated, recognized, listened to and valued is enough motivation for many employees. Supervisors can give this kind of recognition without effecting their budget, yet they are sometimes so reluctant to do so that it is given in eyedropper amounts, once a year at appraisal time.

(6) Agree on needed resources.

A mutual understanding with your supervisor must be reached of what you do, and the training, equipment and staff support you need to do it. Assigning a task without the needed training and equipment is like tying someone's legs and then requiring them to run a race.

(7) Create a score card

Tasks should be so concrete that they can be reduced to a score card, a tally sheet, a graph or computerize metrix. At any moment, an employees should be able to know for themselves and show to anyone who asks how they are doing. They need to know what the score is. Here again, such a score card doesn't presently exist, *you just make it up*. The score card gets its credibility by employees and supervisors using it consistently.

(8) Evaluate accomplishments compared to a standard

Once an initial baseline is established, a standard is born. Future improvements are measured against and compared to the standard. One of the worst things a manager can do is to change the rules (or standards) in the middle of the game.

Due to the page limit of this paper, only three accountability agreement examples are included. They come from a pricing (service) team, an quality team and an administrative team. The scoring system has been simplified and modified to make each example similar. They have been changed to total thousand points.

THE PRICING DIVISION
Service To Negotiate Contract Costs & Prices

Each contract is based on:
Objective Criteria

Task	Number of tasks reviewed ___	
Item	Number of line items ___ x 1.1	Times Factor ___
Experts	Number of personnel involved ___ x 1.1)	Times Factor ___
Analysis	Extent of analysis required ___ x 1.1)	Times Factor ___
Adjustments	Equitable adj. of circumstances beyond control	
	Number of circumstances ___ x 1.1)	Times Factor ___
Actual Time	Days Below Standard	Times Factor ___
Total Points	Intricate computation including difficulty factors	___
Dollars Saved	The amount saved by using the pricing service	___

Subjective Criteria

Depth/Thoroughness Of Prenegotiated Briefing	100
Compliance To Public Law, Field Recommendation	100
Appropriate Analysis Of Techniques & Cost Controls	100
Consideration For Unit Price Integrity & Best Interest Of The U.S.	100

Total Possible Points   **1000**

THE QUALITY DIVISION

Quality Functions	Measurements	Max Points
Strategic Planning	Develop Working Group Models w/Sections	200
Implement Plan Per Group	Meet Milestones By Set Dates	
Maintain PK Level Measurement	Report Monthly To Dir & Div Chiefs	
Assist QI Planning (For Base)Implement At Base Level		
Current/Historical Stats		160
Performance Measurements	Maintain Monthly Reports	
Metrics & MIS Reports	Maintain Monthly Reports	
Develop/Maintain Data Bases		
Benchmark With Other ...	ALC PKs, Outside Business, Other Base Dir.	
Personal/Professional Development		160
System Thinking Course Dev Number Of Presentations & Course Evaluation Ratings		
Follow-On Course Development	Number Of Presentations & Course Evaluation Ratings	
With Other Dir Participation Assess Improved Working Relationship W/ Other Dir		
TQ Support	Attend Meetings	120
Unit Self Assessment (USA)	Participation In Assessments & Activities	
Quality Air Force Assessment	Represent PKs Interests	
Quarterly Quality Fair		
Facilitate Consult Communicate		120
One-Time Facilitating	Customer Evaluation After Facilitating	
OO-ALC IPT & Steering Groups	Maintain A Report Of Meeting Content & Usefulness	
Walk-In & Phone Call Support	Maintain A Log Of Customers	
Quarterly Newsletter	Assess Usefulness	
E-Mail Information	Maintain A Log Of Information	
Ballots & Surveys		120
Headquarters Requirements	Meeting Deadlines & Report Actions Taken	
Base Requests	Meeting Deadlines & Report Actions Taken	
In-House (Employee & Manager)	Beneficial Info Received, Actions Taken	
Off-Sites		
Manager's Off-Sites	Administer Post Off-Site Evaluation	
Team Off-Sites	Administer Post Off-Site Evaluation	
Special Requests	Administer Post Off-Site Evaluation	
Total Possible Points		**1000**

SERVICING DIVISION

Number Of Requests Received	Number ___
Number Of Request Adjusted	Plus Number ___
Number Of Day Adjusted Under Standard	Times Factor ___
Poor Service Feedback	Minus Factor ___
Poor Service Beyond Our Control	Plus Factor ___
Total Possible Points	**1000**

Conclusion:

Retired four-star general, Bill Creech, in his book, *The Five Pillars Of TQM,* shares an experience wherein accountability successfully worked in a small repair shop. It gives an excellent example of how the system at first worked against them, but later by changing it to allow accountability, innovation and improvement were a natural result.

At Langley AFB, 55 employees in the F-15 Eagle fighter wing repaired black boxes. They were alert and well-intentioned, but were focused on their own jobs,- not the overall mission. They were blissfully unaware of how they impacted other areas. They had a "first-in, first-out" repair system. Centralizing handicapped them and decreased productivity.

The shop supervisor was a senior master sergeant, - a sharp, articulate leader, very proud of his operation. He busied himself with a glut of administrative details. There were no other teams, leaders, nor recognizable goals or specific measurements of work done. Plus, there was no link to the larger flying mission of the wing.

Changes were made by an insightful leader who valued innovation understood people and organizational structure. Four teams were created with responsibility, authority and accountability. A team leader was appointed with the added duty to train, counsel and evaluate team members. (Only a decentralized, small organization can identify the "unwilling" and the "unable" employees. Usually, the "unwilling" merely need motivation, and the "unable" need more training. But it is almost impossible to sort that out when they're all lumped together in mass.)

They changed their work priority to "most needed, first out." Similar initiatives flowed thereafter as the team members came up with a stream of ideas. Productivity improved 30% in the first year and quality was greatly improved. Management intervention was

seldom needed. Before the change, turnover rates and re-training costs were high. After the changes where made, requests to transfer into the group quickly increased by 136%.

Their improvements spoke for themselves. The system became largely self-correcting. Getting everyone involved in the architecture made it everyone's system. They owned it.

Often it's not a people problem, but a system problem, but the underlining system is so subtle that it's hard to see it working. Once a correct system is in place it lends itself to accountability. Most conscientious employees prefer to be held accountable for the work they do. It's a secure feeling. It frees them to create the results they want. It is also the best way to show off their works and be rewarded for them.

We can't afford to simply hire employees' *hands* that mindlessly and methodically get the work done. In today's world, we must also employ their *heads* and *hearts*. Their *heads* represent their minds, innovations, creativity. This part of them questions out-dated and out-moded practices and procedures. They come to work mentally engaged. In their *hearts* is found their commitment, their zest and drive. Some government organization are happy with some *hands* to do the work. They don't know how to tap the vast and remarkable resources that are only realized by engaging the *heads* and *hearts* of their employees.

In a widely distributed book, *The Fifth Discipline*, the past CEO of Hanover Insurance is quoted and refers to the vast waste land of unused human resources:

> "People who enter business are bright, well-educated, high-energy people,
> full of energy and desire to make a difference. By the time they are 30, a few
> are on the 'fast track' and the rest 'put in their time' to do what matters to
> them on the weekend. They lose the commitment, the sense of mission and
> the excitement with which they started their careers. We get damn little of
> their energy and almost none of their spirit."

Once the idea enters into employees that they can have a hand in on determining their future and what it is they want to be and do, once the playing field and the rewarded field is fair and level, and once they team together with others who have similar goals, then something emerges that is remarkable and wonderful. Synergy happens. Innovations explode. The well of untapped energies flow. Employees would pay money to be in such an organization and environment.

Continuation Of Paper

The rest of the paper contains:

(1) How the three examples given in the paper link to, enhance and support the team, mission and customers.

(2) What positive and negative consequences come as a result of implementing or not implementing the accountability agreement.

(3) When it is appropriate to renegotiate the agreement.

(4) Examples of score cards.

Works Cited

Creech, Bill *The Five Pillars Of TQM*, Truman Talley Books

Senge, Peter *The Fifth Discipline*, Doubleday Currency Books

Source used, but not cited in the first 10 pages

Block, Peter, *Stewardship,* Berrett-Koehler Publishers

Developing A Corporate Dashboard

Dr. Mary-jo Hall

Dr. Hall serves as the Special Assistant for Quality at the Defense Systems Management College (DSMC), Fort Belvoir, Virginia. She is responsible for assisting the Commandant in institutionalizing quality management principles and practices. DSMC customers include senior military and civilian members of the Department of Defense who are involved in the development, fielding and sustainment of weapon systems. Dr. Hall also teaches in the Managerial Development department. She is on the Corporate Leadership Team and the Academic Board. Dr. Hall served as co-chair of the October 1995 Site Visit for the Baldrige Pilot Education criteria at DSMC.

Dr. Hall is a member of the DSMC Alumni, FEI Alumni, American Society of Military Comptrollers, Academy of Management, American Society of Quality Control (ASQC), and the Washington Deming Study Group. She is a charter member of the National Museum for Women in the Arts and a reviewer for the _Academy of Management_.

Developing A Corporate Dashboard

Dr. Mary-jo Hall
Fort Belvoir, Virginia

Abstract

In order to be aligned with the objectives of the Government Performance and Results Act (GPRA), all federal agencies must ensure that they are managing in a business manner accountable to the taxpayers. All government entities will be required to program goals, measure program performance against those goals, achieve program results and report on their progress. This emphasis focuses on results, quality and customer satisfaction. It demands being both effective and efficient with people and resources.

During the last three years, the Defense Systems Management College (DSMC) has developed a strategy to transform to a more external customer focused organization. This includes a corporate dashboard which reflects a horizontal approach to customer requirements as well as the tenets of the GPRA. Additionally, because we assess our progress using the Baldrige Criteria for Education we are continually incorporating an integrated systems approach to management and measuring.

The purpose of this paper is to discuss the theory behind measurement approach, the development of measures and the implementation of the measurement system.

Introduction

"...The reason US companies failed to see superior Japanese quality coming was that they lacked the proper instruments on their corporate dashboards. The indicators they were watching didn't measure quality. The Japanese indicators did."

Joseph M. Juran
1993

I skate to where I think the puck will be.

Wayne Gretzky

Performance measurement is a topic that is getting extensive attention as organizations transform to manage by processes rather than to react to problems.

According to the Department of Treasury's guidebook (1993, p.3.) performance measurement is "...a process by which a program objectively measures how it is accomplishing its mission through the delivery of products, services or processes."

The adage "What gets measured gets done" is a principle that takes on more importance under process management and the GPRA guidelines. Measurement is a vital aspect if one is interested in changing business practices. Measurement is a requisite for beneficial change and is used to make continual improvements to the change effort.

The soundness of business decisions is directly related to knowledge of the dynamics of organizational processes, whether these are strategic processes or functional processes. Measurement develops knowledge about processes. Using this knowledge to make data - driven decisions can help the entire organization be more productive, efficient in use of resources and effective in program results. It allows decisions to be pushed down to process owners and those who work in the process. It enables process owners to see the importance of performance indicators in achieving quality improvements. The availability of information technology allows most organizations to create, distribute and analyze data and information to a greater extent than in any previous time.

In organizations, measures are collected on a variety of levels. Corporate measurements are generally referred to as strategic because they are the key issues, they are horizontal, and they cut across all divisions. Additionally they are future oriented. The "corporate" dashboard provides a clear picture of the overall "health" of an organization with relatively few - but meaningful measures that are directly related to the objectives for the strategic goals. The goals, in turn, are aligned with the vision. The goals bridge the gap between the present reality and capability and the vision for the future.

The corporate health, as displayed by the dashboard, is not one dimensional. It is multi-dimensional and must include measures for a variety of dimensions. These measures can be referred to as buckets.

Kaplan and Norton (1992) refer to having multiple measurements as maintaining a "balanced scorecard." The "balanced scorecard" concept measures performance from a variety of perspectives including the traditional financial arena. These perspectives include "...customers, internal business processes, and learning and growth" (1996, p. 75). These perspectives are "intangible assets" which help the organization develop competitive status. Goals from these perspectives are cascaded down. For each level in the organization - corporate, business unit, team and personal - goals have objectives, measures and targets. Having these different perspectives provides measures for each of the buckets.

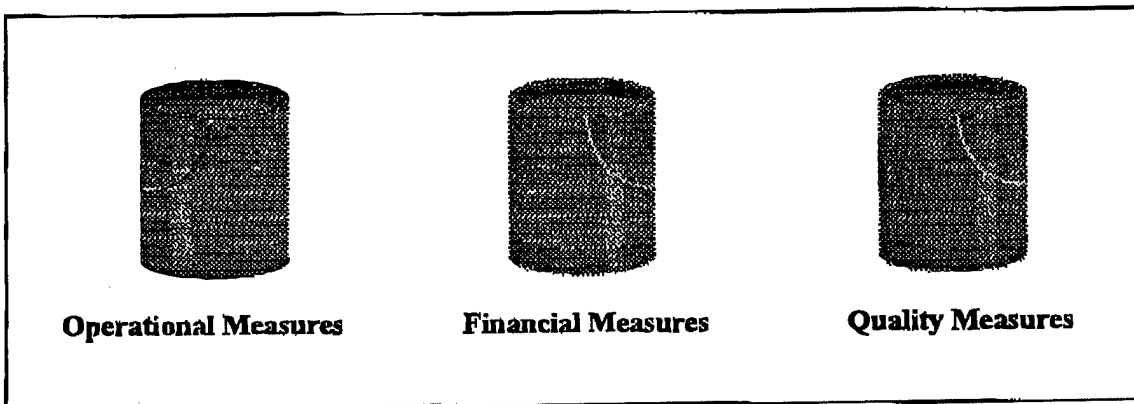| Operational Measures | Financial Measures | Quality Measures |

Figure 1

The balanced scorecard approach helps maintain focus on the different perspectives, but it also helps determine key business drivers or critical success factors. This concept links strategy with resource deployment, resource deployment with execution and executive with results that are both outcome and output oriented. As Kaplan and Norton state:

> The balance scorecard provides a framework for managing the implementation of strategy while allowing the strategy itself to evolve in response to changes in the companies competitive, market and technological environment. (1996, p. 85)

Development Of A Corporate Measurement System

At DSMC we have been working to transform from a vertical organization that solves problems to a horizontal organization that manages processes. This is depicted in Figure 2, a model based on Dr. Deming's view of the organization.

In doing this we have created an infrastructure which has a systems approach, that focuses on customers, manages processes and attempts to get all employees involved in using data to make decisions. We initiated this transformation by answering the following questions:

- What is our purpose? (vision and mission)
- What do we believe in? (values)
- Who are our customers?
- What are our customers' requirements?
- How can we meet these requirements efficiently and effectively? (processes)
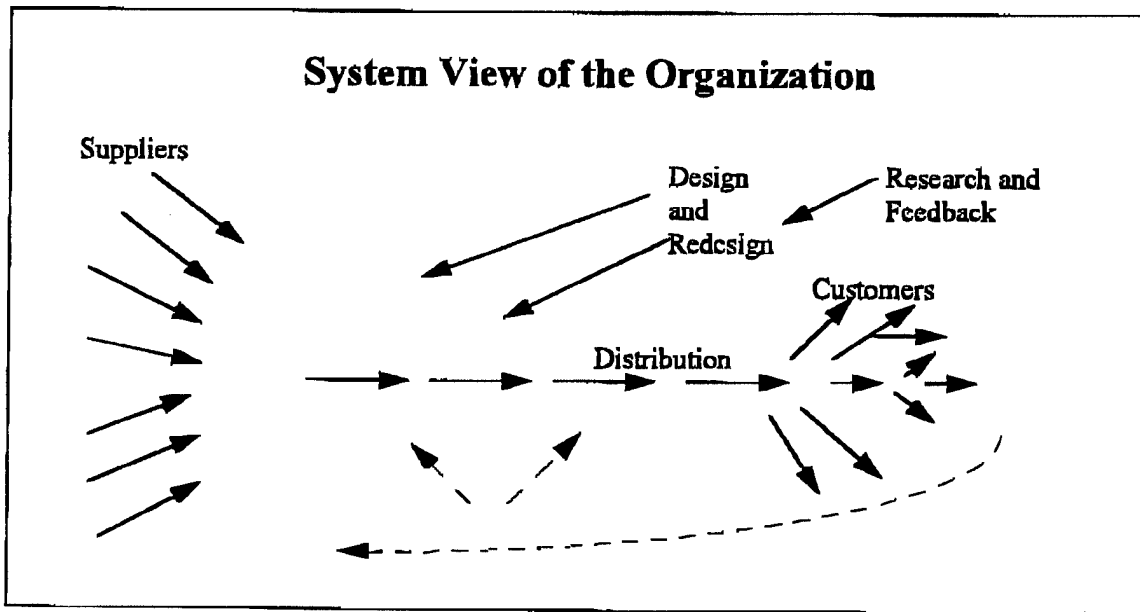- How will we know how we are doing (performance measurement)?

288

System View of the Organization

Suppliers

Design and Redesign

Research and Feedback

Customers

Distribution

Figure 2

The following infrastructure was built to depict the linkages within our infrastructure.

DSMC Strategic Direction

VISION

MISSION

STRATEGIC GOALS

PROCESSES STRATEGIC/FUNCTIONAL

OPERATIONAL OBJECTIVES ACTION PLANS

PERFORMANCE MEASURES DSMC/FUNCTIONAL/DEPARTMENT INDIVIDUAL
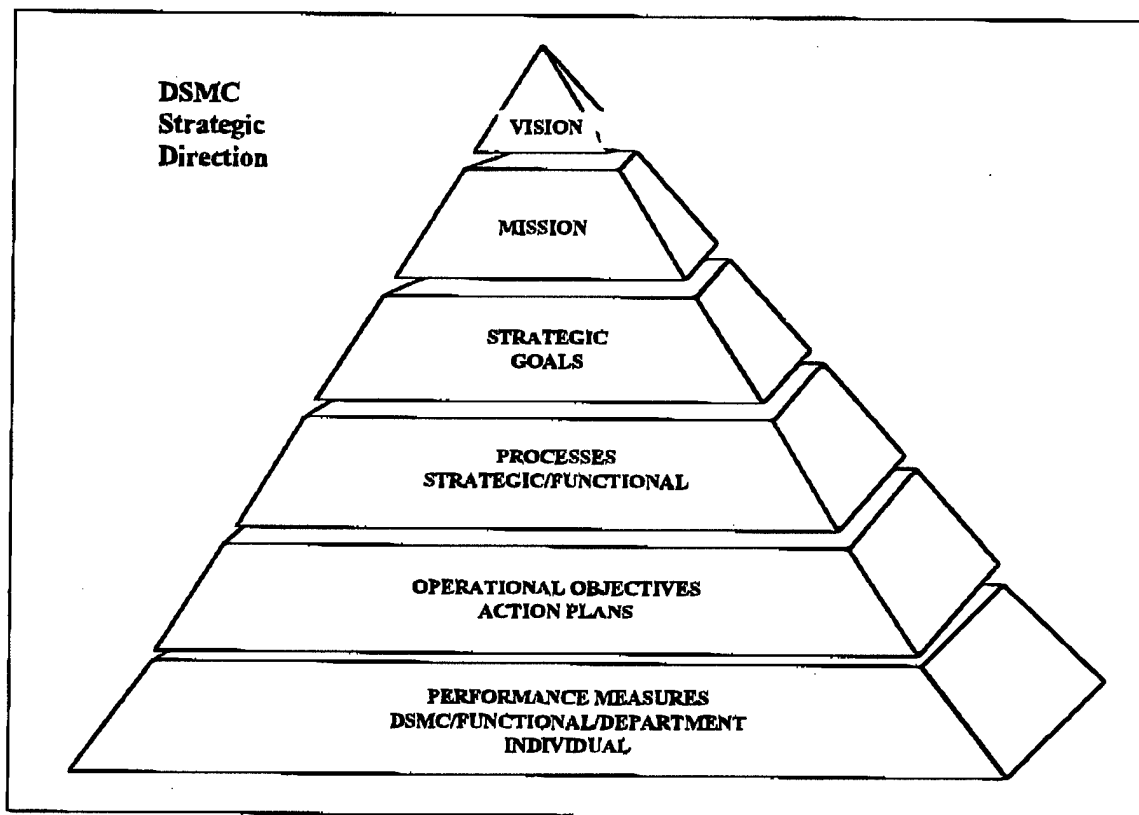
Figure 3

Formerly we had focused primarily on process measures related to financial aspects and student satisfaction with the courses. Using data from an internal survey as well as our transformation model we developed a "corporate dashboard" to assist us become more strategic and horizontal in our measurement.

During a September 1995 strategic session with our partners, Tim Miller of Zenger-Miller and Barba Affourtit of Interaction Research Incorporated, the corporate leadership team developed a draft dashboard using six strategic goals that were developed earlier. Once we were back on campus the division quality coordinators took time to put the goals through a model to distinguished between the end state or goal and the means to accomplish the end state, or objectives. This scrutiny revealed that several of our stated goals were not in fact goals, but objectives or activities. To improve our ability to have accurate measures, we changed goals to the appropriate end state or outcome. We then developed objectives for the goals and specific measures for the objectives. Developing the objectives was work. It required extensive discussion, and debate even when assisted by groupware technology.

The coordinators presented the suggested changes to the corporate leadership team. Work and rework resulted in the present goals, objectives, and measures. A generic depiction of the DSMC Corporate Dashboard is at Figure 4. The measures follow from the three buckets: operational, financial, and quality measures.
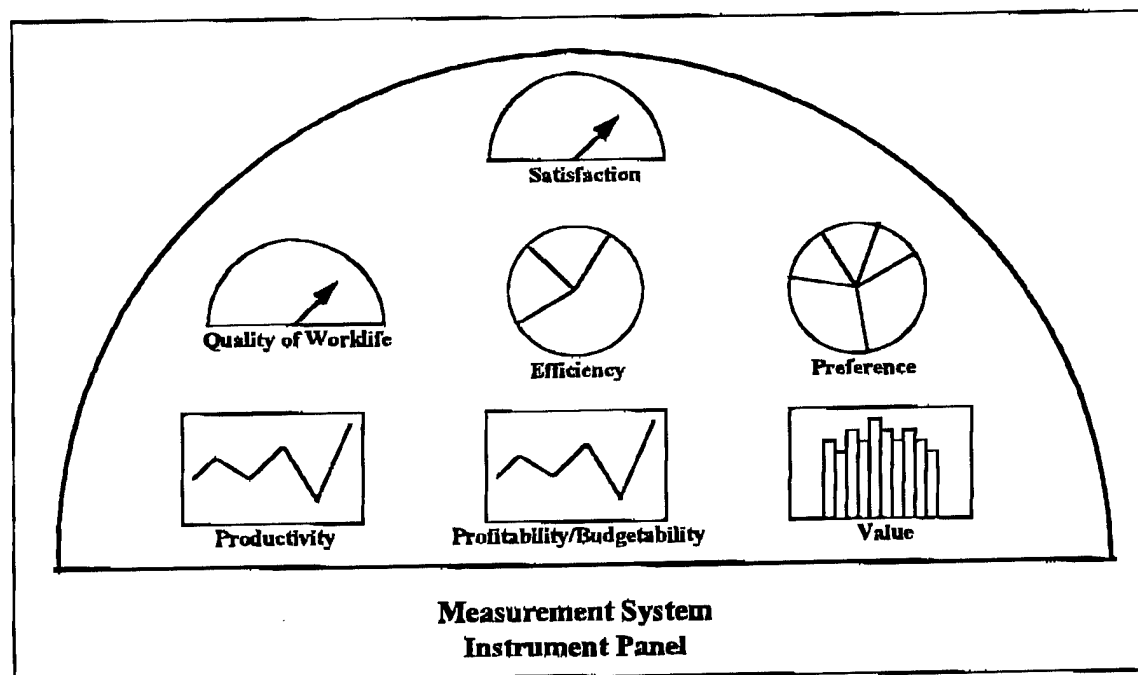

Figure 4

290

Presently the goals are:

Goal # 1 -
To consistently exceed customer needs

How -
- Meet all needs for all courses
- Maintain a balanced cost per product
- Achieve high levels of satisfaction from external customers
- Enhance our ability to exceed customer needs

To DSMC this means -
- Know the customers - understand them, who they are and what they need
- Talk to the customers - communicate, solicit feedback to improve
- Think partnerships
- Increase every individual's capacity to learn

Measurements -
- Customer satisfaction score presented by issue, customer and in aggregate.
- Value per cost by product and product categories
- Value per cost of staff and faculty training
- Number of key/critical processes that have completed an improvement cycle
- Overall satisfaction

Goal # 2 -
To be the academy of choice for Level II, III, and continuing education

How -
- Maintain optimal balance between Level I, II, and III courses and continuing education
- To be recognized as the academy of distinction for acquisition education

To DSMC this means -
- Our specialty is in Level II and III, but we need to balance that with our customers' needs for Level I and continuing education
- Faculty are hired for their operational experience and the ability to teach Level III

Measurements -
- Courses and Student weeks - percentage by level
- Teaching hours - number and percentage by level
- Total cost - by level
- Continuing education hours
- New product response time
- Develop process to assess number of times DSMC is referenced

- Number of DSMC products receiving special recognition
- Number of conference presentations

Goal # 3 -
To increase cooperative efforts with DAU and the consortium schools

How -
- To increase cooperative efforts with the DAU
- Increase cooperative efforts with the consortium schools

To DSMC this means -
- Ongoing efforts to improve processes
- Partnerships
- Sharing best practices

Measurements -
- A measure of the number of significant DAU cooperative efforts
- A measure of the number of significant consortium cooperative efforts

Goal # 4 -
To be the academy of choice for research and consulting assistance to senior DoD leadership, and the worldwide acquisition community

How -
- Support the Acquisition Reform initiatives within DoD and other potential client organizations
- Evaluate DSMC response and support to requests for research and consulting assistance
- Evaluate value-added of DSMC research and consulting projects to its customers

To DSMC this means -
- Research and consulting support the education process
- Research and consulting enable faculty to stay current

Measurements -
- TBD

Goal # 5 -
To utilize appropriate processes and technologies of adult learning theory in all educational products

How -
- Apply these approaches to all courses in the appropriate amount of time
- Ensure instructors have the knowledge, skills, and acceptance required to apply these approaches to course development and execution
- Ensure that these approaches add value to DSMC educational products

To DSMC this means -
- Guided self-directed learning (GSDL) is our approach
- Lifelong learning is the desired outcome

Measurements -
- Extent of application of GSDL in DSMC courses
- Appropriate extent of application of GSDL
- Short term - the extent the College provides the means and the number
- Long term - instructor capacity to use GSDL
- Measure of value (e.g. lifelong learning, improved job performance, ability to apply concepts to changing situations; ability to think, create vision, and solve problems

Goal # 6 -
To expand our customer base

How -
- Consistently bring in business to meet capacity
- Maintain effective resource utilization over time

To DSMC this means -
- Managing the peaks and valleys in workload
- Effective utilization of physical plant

Measurements -
- Incoming vs. actual workload by market segments
- Incoming vs. actual revenues by market segment
- Hours worked (PCCRS) vs. capacity level
- Measure of effectiveness of resource leveling

Implementation Of A Measurement System

The purpose of measurement is to effect changes which result in providing products and services of increased value to the customer and at a higher level of satisfaction. This means products and services that are faster, cheaper, and better. Putting this together as a system results in the diagram in Figure 5. Monitoring a process with metrics allows the employees who own a process to monitor progress and make decisions. Because decisions are based on data, the data must be both valid and reliable.

DSMC... Putting it all together

Leadership and Strategic Direction

Customer Focus → Increased customer satisfaction

Employee Involvement → Creativity and higher morale

Process Management → Reduced cycle times, waste, costs

Increased Marketplace Success

Lower Operating Costs

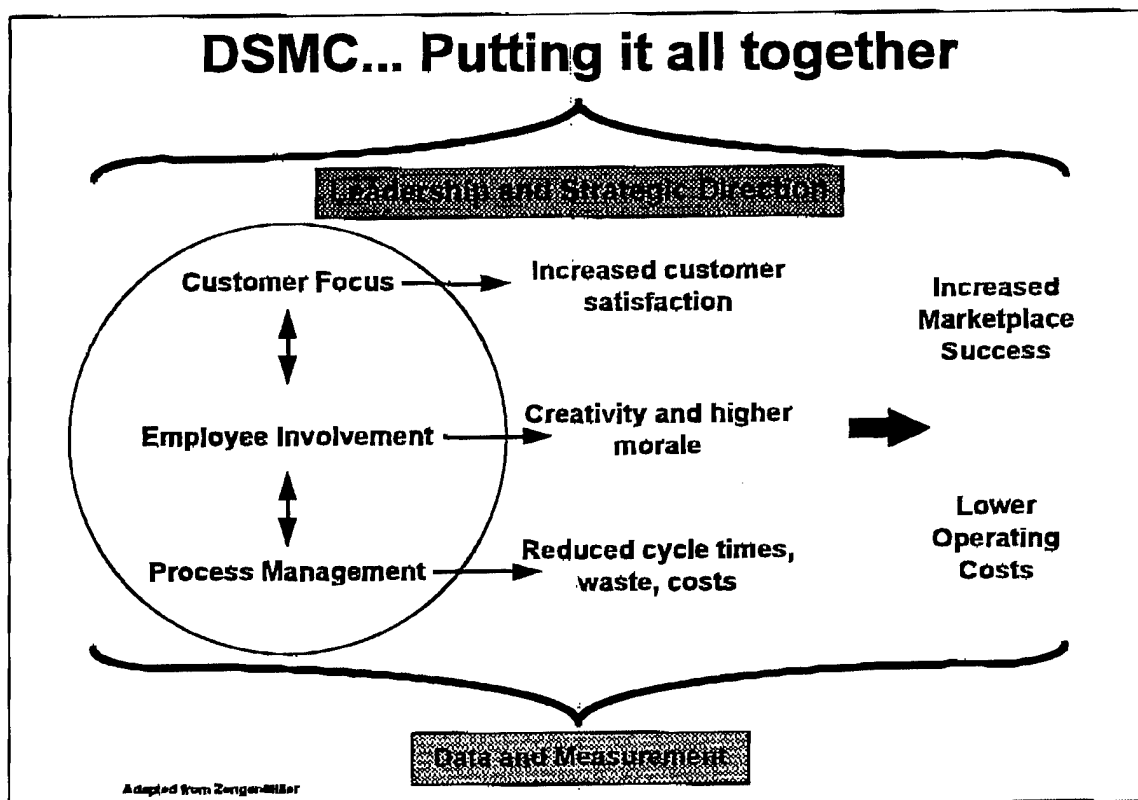Data and Measurement

Adapted from Zenger-Miller

Figure 20-5

At DSMC we monitor the measurements and report on them at Quarterly Reviews. Each strategic goal has an executive agent who has ultimate responsibility for the results. The reporting is generally done by process owners. Discussion at the review centers around the following:

Is the measure meaningful?
Is it linked to customer requirements?
Is it understood?
Is it operational defined?
Does it focus on outcomes?

Summary

The selection of measurement indicators needs to consider the strategic direction of the organization. The measurement of objectives which support the strategic goals provide a corporate summary of the overall health of the organization. These measures need to be meaningful to everyone in the organization in order to align strategic goals with processes. The creation of a corporate dashboard that uses a "balanced scorecard" approach can help focus the leadership on the vision. Using the tenets of GPRA focuses on outcomes and results. Using the criteria in the Baldrige can be a yardstick to measure progress toward realizing the vision.

Works Cited

Affortit, Barba. "What to Measure and How" <u>Process Improvement: The DSMC Approach</u>. Washington, DC: US Government Printing Office 1995.

"Executive Guide: Effectively Implementing the Government Performance and Results Act; GAO Report # GGD-96-118; June 1996

Kaplan, Robert S. and Norton, David P. "The Balanced Scorecard - Measures That Drive Performance" <u>Harvard Business Review</u>. June - Feb 1992, pp 71-79

Kaplan, Robert S. and Norton, David P. "Using the Balanced Scorecard as a Strategic Management System" <u>Harvard Business Review</u>. Jan - Feb 1996., pp

Nolan, Tom W. "Making Changes that Result in Improvement". International Deming Users' Group Conference proceedings.

<u>Performance Measurement Guide</u>, Department of the Treasury, November 1993

Sink, D. Scott and Tuttle, Thomas C. <u>Planning and Measurement in Your Organization of the Future</u>. Norcross, GA: Institute of Industrial Engineers. 1989.

United States Air Force. <u>The Quality Approach</u>. Fall 1993.

Environmental Quality
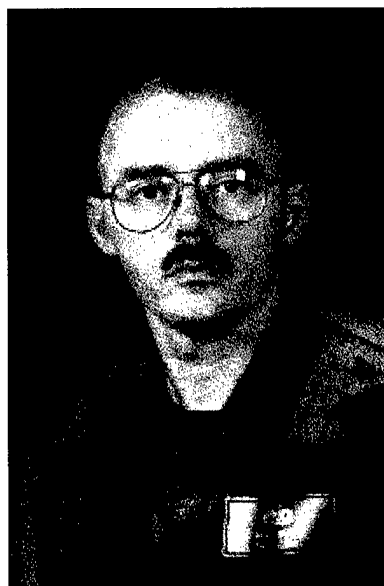
TSgt Greg Haugen

TSgt Greg Haugen is presently assigned to the 347th Supply Squadron as the NCOIC of the Hazardous Materials Element also known as HAZMART. He was formerly assigned to the 347th Maintenance Squadron as a Structural Maintenance Technician.

TSgt Haugen PCA'd to the Supply Squadron in 1993 to help establish the HAZMART pharmacy. He volunteered his knowledge of hazardous waste management allowing Moody AFB's HAZMART to offer a complete cradle to grave hazardous material tracking.

TSgt Haugen has 13 years experience in hazardous waste management. He is a qualified Environmental Compliance Assessment and Management Program (ECAMP) instructor. He has been a Hazardous Material/Waste Assessor on the last 6 ECAMP Assessments for Moody. His hazardous materials/waste education includes, 40 hour Resource Conservation and Recovery Act (RCRA) training, Environmental law for non-Environmental lawyers, Hazardous Materials Handling course offered through the U S Army Logistics Management College, and Defense Hazardous Materials/Waste Handling course offered by the Army Institute for Professional Development.

Environmental Quality

TSgt Gregory L. Haugen
347th Wing, Supply Squadron

Abstract

On 1 November 1993, a Hazardous Material Center (HAZMART) was activated at Moody AFB, GA, and operated by the 347th Supply Squadron with a charter to provide "cradle to grave" management of hazardous materials, disposal of hazardous waste in an environmentally safe manner, and the identification of safe substitutes.

A process was developed to reduce and control hazardous material issues, their use, and recycling potential. The combination of these initiatives and a first-class waste disposal program resulted in a savings of approximately $260,000 to date and selection as Air Combat Command's nominee for the 1995 Defense Standardization Program Award, Team Category. A truly successful journey which started with a vision.

The Journey Began

Vision

The overall vision of the Center was to completely control, track, and dispose of all hazardous materials transported on and off Moody AFB.

Startup

When the 347th Wing began to plan the startup of a HAZMART, our strategic plan consisted of three main points: (1) managing hazardous materials from "cradle to grave," (2) centralizing control of hazardous materials and hazardous waste, and (3) maintaining 100% customer satisfaction.

Initial thinking had the program based under the Logistics Support Squadron. While this offered a centralized management capability, the distribution of funds, storage facilities, and vehicles for the Center proved to be difficult.

Instead, relocating the Center to the Supply Squadron seemed to be more logical. The Supply Squadron already had the storage facilities in place and operational. Storage, tracking, accountability, issue, and delivery of hazardous materials were already in place within the supply system.

With the process owner in place, the rest of the program became a real wing effort. Without the support from all squadron commanders, branch chiefs, element chiefs, and the actual workers, this program would not be able to function.

As with any job, the right people were needed to make this new process a success. With cooperation from all future customers, it was agreed to combine talents and recruit personnel throughout the wing.

Manpower

A team of two Supply, four Maintenance, and rotating civilian personnel were assembled to make the HAZMART concept become reality. This mix of having Supply personnel and Maintainers working side by side created an excellent working environment. Supply personnel provide the issue, receiving, warehousing, and administrative skills necessary to store and warehouse in excess of 350 free-issue hazardous material assets while Maintenance personnel, because of their background, provide the backbone for the hazardous waste program.

Maintenance personnel, as the largest users of hazardous materials in the wing, possess a strong working knowledge of 98% of all materials processed through the Center. This accumulation of knowledge also proved to be valuable when deleting expired shelf-life assets and items no longer required.

The combined effort of managing the hazardous material program ensured shelf-life compliance was maintained and the customer was afforded a quality product upon request.

The incorporation of civilian personnel within the Center provided HAZMART with the flexibility to handle a demanding schedule. Rotating the civilians on a 90-day basis provided the continuity necessary for the Center to run smoothly and still accommodate military personnel being tasked outside the shop for varying periods of time without affecting the mission. TDYs, training, conferences, and seminars all create manning concerns.

Implementation

With the HAZMART concept starting to come together, implementation was our next step. HAZMART supervisors traveled to Air Force bases where the concept was in progress and gathered information from HAZMART personnel, customers, and Supply personnel. These visits assisted tremendously in tailoring our program to best fit the needs of our wing. We also invited other bases to visit our facilities.

Training was another important part of the process. All HAZMART personnel attend annual training which included Resource Conservation and Recovery Act (RCRA), Federal Hazard Communication (HAZCOM), Hazardous Waste Operations and Emergency Response (HAZWOPER), and Hazardous Waste Management training. Some local training was provided by the Wing Environmental Office; however, most training was received through other sources.

Our people were able to participate in several correspondence courses offered through the Army. HAZMART personnel receive information through commercial publications about other courses and took advantage of as many as possible.

Initial storage facilities were obtained "out of hide." An older warehouse was remodeled to house all excess/unused material recovered from work centers. This represented a major self-help project that involved sealing floor drains, repainting the floors and walls, installing new shelving to establish bin rows for the proper storage of the hazardous material.

Office equipment, such as desks, chairs, and bookcases, were acquired through the local Defense Reutilization and Marketing Office (DRMO). All vehicles which included a 6k forklift, 1/4 ton pickup, and a 1 ton stake bed truck were obtained on a 30-day program from the Transportation Squadron. All computers were provided by Headquarters Air Combat Command.

By 1995, all equipment, including vehicles and furniture, had been upgraded and permanently assigned to the Center.

Conservative purchasing techniques enabled the Supply Squadron to absorb most of the operational costs. However, major equipment requests were made through the A-106 program and to date $47,000 has been authorized for the purchase of a 55-gallon drum crusher ($30,000), two hazardous waste weigh scales ($2,000), and upgrades to our current computer system ($15,000).

The initial hurdle of integrating customers into the HAZMART Center presented a challenge to the HAZMART personnel. Their challenge was to convince customers that they could remove all excess or "just in case" material from their work center and be able to receive instant response from HAZMART.

Customers were allowed to establish and maintain a 3- to 5-day supply of hazardous material based on workload and Technical Order references. Once calculated, all other excess material was removed from the shops and placed in the "free-issue" warehouse.

Guaranteeing 40-minute delivery on expedite orders helped convince customers that this concept would work. HAZMART hours of operation, 0730-1630, Mon-Fri, were established and personnel were assigned standby duty on a rotational basis. Providing around-the-clock coverage enabled HAZMART to issue hazardous material any time of day or night, as mission dictates.

The wing conversion was planned carefully. We were careful not to overload the system in its early stages. By listening to our customers' needs, we were able to take one group at a time. Work centers were incorporated into the Center according to mission requirements. Work centers that had small amounts of hazardous material on their bench stock were taken first. Large work centers, such as Structural Maintenance and Aerospace Ground Equipment, were accepted later so as not to disrupt their operation.

Management Indicators

After implementation, HAZMART set indicators to monitor their performance. The first step was to measure how we were controlling the users of hazardous materials.

Working close with Bioenvironmental Engineers, we were able to identify all users of hazardous materials. Customers were then required to provide Bioenvironmental Engineers a listing of all hazardous materials which were used to authorize the use of health hazard materials requiring medical approval. These items, primarily paints and related materials, solvents, thinners, adhesives, sealants, gaskets, and certain switches, were then assigned Issue Exception Codes (IEX).

Not all items fall into the same IEX code. At Moody, we use IEX codes X, 8, 9, and M. Items that carry an IEX code of X may not have a health hazard associated with them, but have the potential to create a hazardous waste if not managed properly. IEX code 8 items need only medical notification approval. All IEX code 9 items require that HAZMART call Bioenvironmental for actual approval. IEX code M material is flagged as an Ozone Depleting Chemical.

All customers were required to develop an IEX letter listing all required material, have it approved by Bioenvironmental, and furnish it to HAZMART prior to ordering any hazardous material.

All requests for hazardous material are verified by IEX letters and a phone call directly to the Bioenvironmental office. After-hours and on weekends, all requests are approved by letter.

Letters must be updated annually. They must also be updated when IEX codes change or the customer has a change in their process. No requests for hazardous materials will be processed against an expired/outdated letter.

After a work center is programmed into the HAZMART system, it is no longer allowed to have hazardous materials on their bench stock. All requests for hazardous materials are processed through HAZMART. If HAZMART, through their monitorship of the program, discovers that work centers are circumventing the system, their orders are returned to stock and all monies lost.

The reduction of unused material was the next step in the our process. HAZMART personnel did a walk-through inspection of the hazardous materials storage area in the main Supply Squadron warehouse. The personnel with Maintenance backgrounds were able to identify material that was no longer used in the field. These materials were items left over from other weapons systems, special projects, and Immediate Action Technical Compliance Technical Order (TCTOs). Eliminating all unused items from the warehouse gave HAZMART a better picture of the actual amount of hazardous materials needed within the wing.

During the initial briefing, all work centers were required to furnish TO figures and indexes to justify continued stockage of an item. Once each work center provided HAZMART their listings of justified materials, HAZMART personnel began the task of reducing demand levels, adding special codes, and depleting the stock of the unneeded items.

Initially HAZMART personnel tried to control inventory purchasing in the main Supply warehouse by adjusting the demand codes (recurring/nonrecurring) at the time of request. This plan seemed to be making a great deal of progress in the reduction of hazardous materials, until we started to deplete stock for certain critical items.

For those not familiar with demand codes (as were the Maintenance folks), they drive the decision as to whether or not you stock an item. Since HAZMART utilized the nonrecurring (one time requirement) demand code and wasn't fully aware of its implication, we actually depleted our stock of aircraft turbine engine oil, aircraft paint thinner, and aircraft paint. The lesson learned was to reduce items by slowly adjusting demand levels and don't try for overnight success.

After HAZMART removed those unused items from the inventory, hazardous items were replaced with non-hazardous items. Headquarters ACC provided a great deal of information toward the replacement of hazardous items. HAZMART personnel also use PRO-ACT for information which sponsored by the Headquarters Air Force Center for

301

Environmental Excellence. The program offers answers to all sorts of questions ranging from a substitute for a flat black polyurethane paint to the proper disposal of epinephrine.

Some items that were removed from inventory we were able to purchase using the IMPAC program. These products range from automotive paint for Transportation to WD-40 used in the Metals Technology Shop. Although the IMPAC program is a viable option, some squadrons divide funds differently and the use of the program can be limited.

The reuse of items was another way to monitor the HAZMART program. Being familiar with customer processes allows HAZMART to redistribute items that one work center no longer required to a shop that could use them. For instance, if the Structural Maintenance Shop could no longer use an adhesive because of a shelf-life problem, another shop could use it for laying floor tile. Items such as outdated aircraft paint, machinist dyes, and excess self-help paint have been used to paint annual 347th Wing Christmas cards for display during the holidays.

Working closely with our DRMO, we have been able to identify products such as outdated paint, grease, oil, sealants, adhesives, and automotive batteries that state agencies could use. Rather than processing these products as hazardous waste for disposal, we process them as individual transfers to DRMO (not waste). This allows DRMO to sale/transfer them to state agencies. Maximizing reuse of items not only saves storage space, but waste disposal dollars as well.

Recycling products also significantly reduce the amount of time and money used in the waste disposal process. HAZMART personnel coordinated with the Environmental Flight in CE to recycle all petroleum products. As a result of their efforts, brake fluid, hydraulic fluid, motor oils, fuels, and any other petroleum-based products are collected by the work centers in approved containers. Once a month, or as needed, a civilian contractor empties these containers and processes the contents for recycling.

The Transportation Squadron is currently the focal point for all antifreeze recycling within the wing. In the 2 years that HAZMART has been in operation, we have ordered no new antifreeze. Transportation Squadron supervision has been the key to the operations success. They provided education to customers about the benefits of recycled antifreeze and, as a result, the availability of the product has been outstanding.

Hazardous Waste

Realizing the importance of customer satisfaction, Moody's HAZMART decided to incorporate the management and disposal of hazardous waste within the 347th Wing. The previous method required the customer to hand carry paperwork to many offices and spend much time waiting for signatures and funding.

The nature of the HAZMART concept and the hazardous waste background within the shop made this an effortless transition. Wing environmental personnel provided training on classification, accumulation, packaging, labeling, funding, and disposal of hazardous waste. Local Defense Reutilization and Marketing Office personnel provided training on transportation and shipping containers. HAZMART personnel receive annual Resource Conservation and Recovery Act (RCRA), Federal Hazard Communication (HAZCOM), Hazardous Waste Operations (HAZWOPER), and Hazardous Waste Management training. Seminars, symposiums, conferences, and Air Force Institute of Technology classes are included in our annual training.

HAZMART personnel assisted customers in establishing accumulation points for each of their waste streams. Upon request from the customer, they coordinated with Bioenvironmental to sample the waste stream for classification. Container requirements, labels, waste stream profile sheets, and accumulation responsibilities were furnished at the time of the initial briefing, and HAZMART requires notification prior to any changes in the process generating the waste stream.

HAZMART manages a 90-day accumulation area for the temporary storage of hazardous waste generated throughout the wing. Customers need only to call when hazardous waste containers are full. HAZMART will pick up containers and prepare them to be transferred to DRMO.

By conducting spot inspections during deliveries and pickups, HAZMART personnel ensure that work centers are in compliance with local, state, and federal Environmental Protection Agency requirements.

All funding for waste disposal is accomplished by HAZMART. Each quarter, the CE Funds Management office allocates money that is tracked on an Air Force Form 616. This means that all paperwork required for the disposal of hazardous waste is centralized in one office, eliminating the waiting time for approval of available funds and enabling HAZMART personnel to ensure all hazardous waste is transferred to DRMO in an expedient manner.

Results

After 2 short years of operation, Moody's HAZMART has made quite an impact throughout the wing. A total of 110 work centers are now fully incorporated into the HAZMART concept. The number of hazardous material line items stored on Moody has been reduced by 130. The wing has realized a savings of $200,000 by this reduction. There has been $38,000 saved through reuse of unwanted items. The cost of hazardous waste disposal has decreased by $22,000. By controlling the amount of material that work centers order, most have seen a reduction of at least 75% of shop stock. This is reflected in the decrease in the amount of material normally disposed due to an expired shelf-life.

Future

The HAZMART Pharmacy concept opened the doors to a program that presents unlimited growth potential. Future plans, which are ambitious but obtainable, call for total base involvement in a concept that has adequate military and civilian manning authorizations to ensure continuity.

Our objective is to complete the establishment of a One-Stop Hazardous Material Shop which will include the Base Exchange, Commissary, NAF activities, and on-base contractors. It will also include integration of CE environmental and hospital Bioenvironmental personnel and their computer databases into the program.

With funding assistance from HQ ACC, we plan to obtain "state of the art" computer systems for asset accountability and communications, with access to worldwide environmental nets.

Ultimately, we will reduce hazardous material stored on Moody AFB to a 3-day, mission-essential supply with backup commercial sources that are responsive to Contracting demands or IMPAC purchases.

Conclusion

Due to the nature of our business, protecting the environment is one of the most important issues that face our personnel today. With the environmental laws and regulations changing constantly, it can be impossible for everybody to stay ahead of the game. Initiating a program such as a hazardous material pharmacy, that effects virtually everyone throughout a wing, without customer support could prove to be disastrous.

By including the process owner (i.e., squadron commanders, branch chiefs, shop chiefs, supervisors, and the actual workers) in the development of the pharmacy program, we made it a team concept. We realized that incorporating customers up front can make a new program a fresh new idea, not just another program that people are forced into.

Customer satisfaction is the key to our success. Moody's HAZMART personnel make this their number one priority. As laws and regulations change, we ensure our customers are informed as soon as we receive the information. This allow them to know why things are changing and how it will affect them as process owners.

With the exception of the actual enforcing of our standards, our customers are as much a part of HAZMART as we are. This teamwork has enabled Moody's HAZMART to become the benchmark for others to follow.

Reengineering For A QAF...A Look At The Composite Wing Of The Future
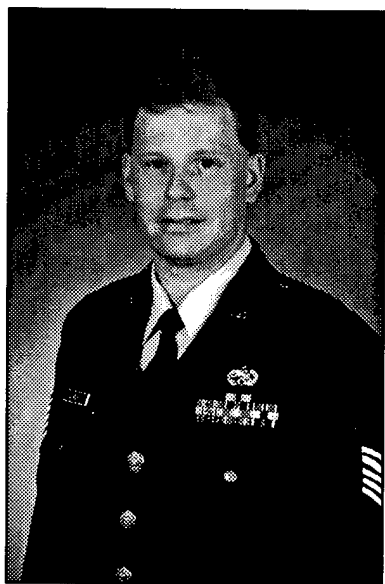
TSgt Douglas R. Gaines   SSgt Joel C. Whalen

TSgt Gaines serves as the quality consultant for the 18th Wing, Kadena AB, Okinawa, Japan. He is responsible for the wing's quality structure support process; primary duties include consulting on strategic planning, Unit Self Assessments (USA), and benchmarking. TSgt Gaines has a bachelor's degree in computer science from University of Maryland, and is currently working on a master's of science in management with Troy State University. He is a member of the American Society for Quality Control.

SSgt Whalen serves as a quality advisor for the 18th Logistics Group, Kadena AB, Okinawa, Japan. His responsibilities include consulting on customer feedback systems, Unit Self Assessments, benchmarking and strategic planning. SSgt Whalen is currently pursuing a BS in management from University of Maryland. He is a member of the American Society for Quality Control.

SSgt Marks (PICTURE NOT AVAILABLE)

SSgt Marks serves as the quality advisor for the 18th Maintenance Squadron, Kadena AB, Okinawa, Japan. Her primary responsibilities include consulting on strategic planning, metric development, and QAF criteria implementation. SSgt Marks is currently pursuing a BS in education from University of Maryland and has logged over 270 hours in specialized QAF training.

Reengineering For A QAF...A Look At The Composite Wing Of The Future

Tsgt Douglas R. Gaines
SSgt Joel C. Whalen
Ssgt Marks
Kadena AB, Japan

Abstract

The objective of this paper is to communicate a vision to Air Force people, specifically Air Force leaders. We hope that our idea of a QAF in the 21st century inspires you and opens your mind to the tremendous opportunities on the horizon. Furthermore, we hope our vision will incite you, Air Force senior leaders, to reengineer for the 21st century.

Our visionary tale begins and ends with the reason the Air Force exists—"to fight and win America's wars." Focusing on the mission of a typical composite combat wing we compare and contrast present problems with the opportunities or solutions of the future. Briefly, we explain barriers associated with the current hierarchical structure and provide some examples. Next, we layout a new structure for the composite wing of the 21st century and explain how this system uses innovation and technology to remove barriers associated with the "old" hierarchical structure.

We realize that the typical Air Force Wing is a complex system of interrelated product and service delivery processes and key organizational support processes. However, for the purposes of this paper we only discuss the "tip of the spear" or key process of a composite combat wing.

The Mission

At any given time a composite combat wing is ready to perform its' primary mission...defending United States and allied interests with airpower. To perform this mission Air Force leaders have developed and implemented a tall hierarchical organizational structure designed to provide centralized command and control and decentralized mission execution. Figure one portrays the typical structure of an Air Force composite combat wing.

The Current Organization

```
                          Wing
                        Commander

              Wing                    Senior
              Staff                   Enlisted
            Agencies                  Advisor

  Civil Engineer    Logistics      Medical       Operations        Support
     Group            Group          Group          Group            Group

  Civil Engineer    Contracting   Aerospace Medicine   Air Control    Communications
    Squadron         Squadron        Squadron           Squadron        Squadron

  Civil Engineer   Logistics Support   Dental         Air Control     Mission Support
    Squadron          Squadron        Squadron          Flight           Squadron

                   Maintenance    Medical Operations  Air Refueling   Security Police
                     Squadron        Squadron           Squadron         Squadron

                    Munitions     Medical Support        AACS           Services
                    Squadron        Squadron            Squadron        Squadron

                     Supply                             Fighter
                    Squadron                            Squadron

                  Transportation                        Fighter
                    Squadron                            Squadron

                                                        Fighter
                                                        Squadron

                                                   Operations Support
                                                        Squadron

                                                         Rescue
                                                        Squadron
```
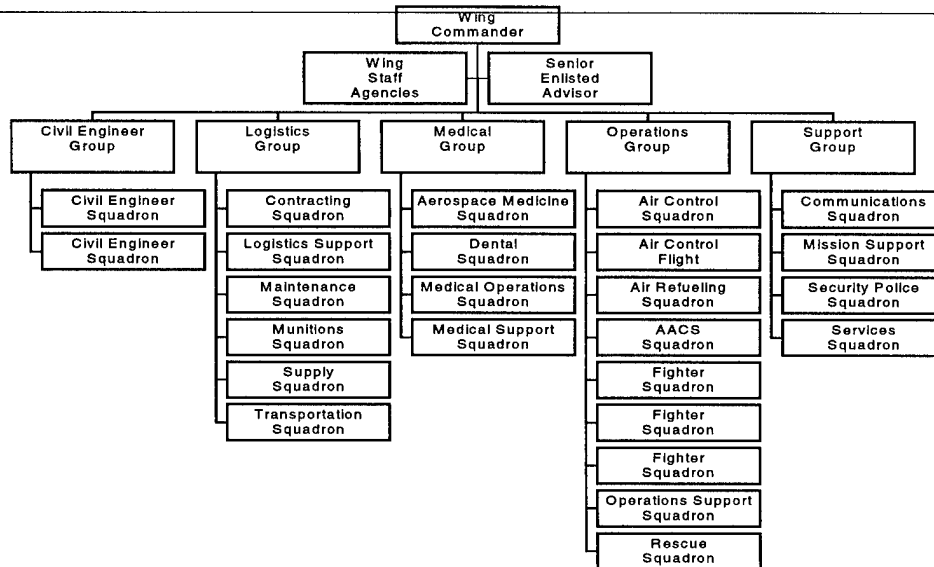
FIGURE 1: AN AIR FORCE COMPOSITE COMBAT WING ORGANIZATIONAL

Figure 1: An Air Force Composite Combat Wing Organizational

The Current Organization

Airpower is designed, produced, and delivered via a process (see figure two). Air Force People performing this process are what accomplish the mission. The current structure tends to impede mission accomplishment by interrupting the natural flow of the process. Figure two depicts how the process of delivering airpower is sub-divided and broken-up by "wall-like" barriers between various wing functions. Bottom line, the current hierarchical organizational structure of composite combat wings contradict effective, efficient mission accomplishment.
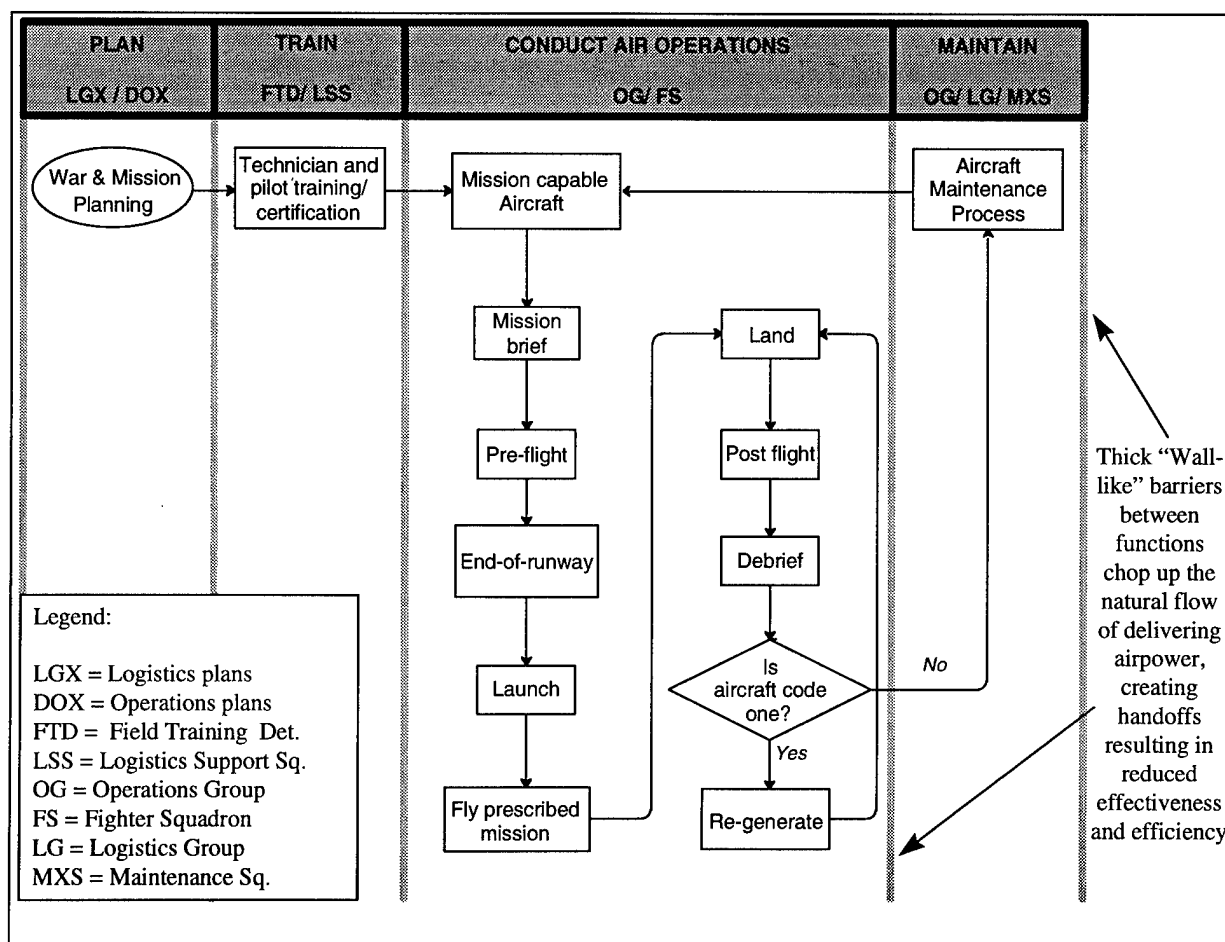
FIGURE 2: THE PROCESS OF PROVIDING AIRPOWER AND THE DYSFUNCTIONAL EFFECT THAT FUNCTIONS HAVE ON THE PROCESS.

Organizational Structure

The current structure causes many barriers to successful mission accomplishment. These barriers can generally be grouped into three main categories (see table one in figure three). Analyzing the interrelationships between the current organizational structure and each barrier helps to draw some basic conclusions (see figure three). It appears that leadership is the primary driver and primary effect in a hierarchical wing. Meaning, oddly enough, that leadership becomes its own worst enemy. How? Leadership causes/influences the design of the organizational structure; the structure in turn causes/influences the organizations information systems; the information systems cause/influence the communication processes; and all three cause/influence the leadership system. Now, let's briefly turn our attention to some specific examples associated with each category.

RANKING	CATEGORY
1.	Leadership Barriers
2.	Information System Barriers
3.	Communication Barriers

TABLE 1: MAJOR CATEGORIES OF BARRIERS RANKED BY IMPORTANCE

Leadership is the primary driver and ultimately effected! Leadership creates the organizational structure which causes/influences the organizations information systems and communication processes. The organizational structure, information systems, and communication processes then shape the leadership system. Leardership must redesign the organizational processes and structure for the 21st Century!

FIGURE 3: INTERRELATIONSHIPS OF BARRIERS TO MISSION ACCOMPLISHMENT

Figure 3: Interrelationships of barriers to mission accomplishment

Leadership

The effect of the hierarchical organization on leadership is quite a paradox. The paradox evolves slowly, over time, and seems normal enough within the chaos of daily operations. But at a distance a destructive pattern—unhealthy competition and fear—begins to emerge. For example:

- Unhealthy competition: Hierarchies have a negative effect on the award system. The existence of functional awards promotes negative behavior (behavior not aligned with mission accomplishment) among individuals. To an extent, leadership's success is measured by the number of awards garnered by their function. As a result leaders place high value on the awards breeding unhealthy competition between functions of the organization and individuals within. Unhealthy competition is characterized as competition that detracts from accomplishing the mission or serving the customer. Rewards that are designed to increase the value of individuals and functions instead of promoting mission oriented behavior are ultimately destructive. Examples include: EPRs, decorations, monthly, quarterly, and annual awards. Many of these awards promote individualistic behavior and merely "go around" the organization instead of reinforcing behaviors associated with improving mission effectiveness and increasing customer focus. These awards spawn unhealthy competition and are aimed at making individuals and pieces of the organization look good—often to garner more awards. "Things that get rewarded get done...if you're not getting the results you want...ask yourself, 'what is being rewarded?'"

- Fear: Fear is destructive and can quickly erode the values and cultural foundation of an organization. There are many examples demonstrating the existence fear in the leadership system of the hierarchical organization. Mistakes are covered up out of fear for one's job. New and creative ideas are not uttered for fear of rejection or reprisal. The most destructive example, is when real operating capabilities are hidden producing a facade upon which bad decisions are made and subsequently carried out.

Information Systems

Leaders within a hierarchical organization are data rich and information poor. Functions must show their worth, therefore, information technology (IT) is designed to track outputs of a particular functional area. The functional information system is incompatible with other systems throughout the wing resulting in fragmented information systems that don't "talk" to each other...sub-optimizing the communication process and wing system. As a result, information systems do not provide members the vital system performance data and information needed to maintain and control the processes that accomplish the mission. Computers are optimized to collect statistics on activities that are used to justify the worth of a

function resulting in "apples and oranges" data when looked at from the systems perspective. Functions do not want to share information because they want to be the best (to garner awards) or are afraid to share because of mis-trust and fear. New systems are put in place to simply maneuver the bureaucracy faster or automate old antiquated manual processes resulting in nothing more than clumsy automated processes that still must be fixed. Information Systems, that in the end, stifle any creative or innovative ideas prematurely.

Communications

Barriers to communication may be the most destructive. After all, when miscommunication occurs, lives hang in the balance. For examples:

- Knowledge is power. Structural flaws highlighted to this point included loyalties to the function, unhealthy competition, and a mind set of fear—these same forces are at work to undermine communication. Because these factors are present Individuals withhold and report inaccurate information. After all, "Why should I tell you how to perform a particular task when I can hoard the knowledge, be a hero, and earn five's on my EPR or meet standards on my OPR."

Despite the barriers of our current form of organization we are still the best and most respected Air and Space Force in the world...amazing! Truthfully, the Air Force has been able to stay on top, surviving the perils of the current structure only through huge expenditures of resources. Budgets are shrinking, the force is drawing down at alarming rates, and the USAF simply cannot afford to do business as it has in the past. The only constant is change and tomorrow is today—restructuring may be the only way! And now for the future...our vision...a look at the composite wing of the 21st Century and its' affect on the mission.

The New Organization

In the next century wings will be flat and organized around the very processes that are at the core of accomplishing the mission. Streamline and flexible, the new organization will capitalize on technology and innovation spawned from collaboration between organizational team members. The barriers of the old hierarchy will disappear.
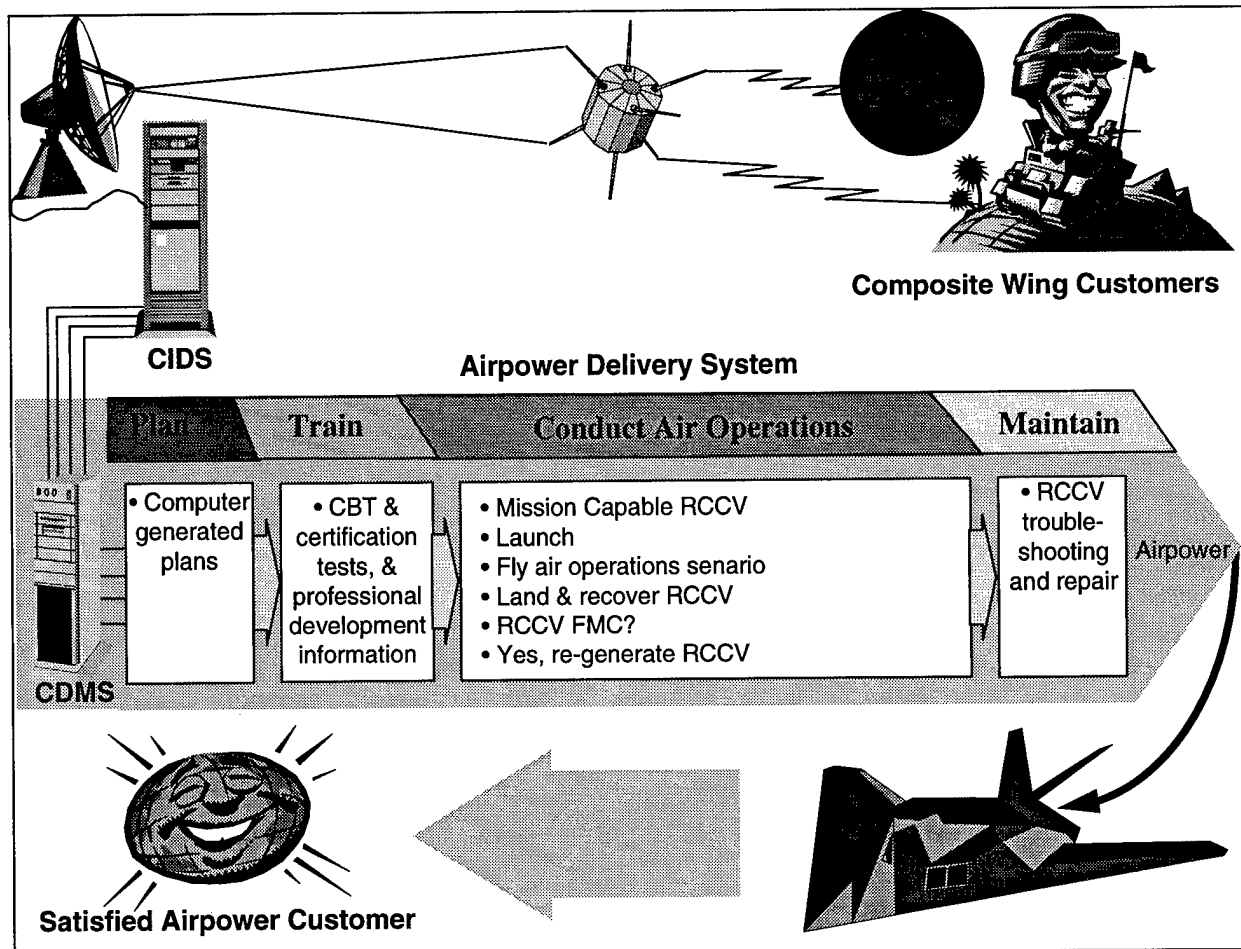
Composite Wing Customers

CIDS

Airpower Delivery System

Plan | Train | Conduct Air Operations | Maintain

- Computer generated plans

- CBT & certification tests, & professional development information

- Mission Capable RCCV
- Launch
- Fly air operations senario
- Land & recover RCCV
- RCCV FMC?
- Yes, re-generate RCCV

- RCCV trouble-shooting and repair

Airpower

CDMS

Satisfied Airpower Customer

FIGURE 4: THE NEW COMPOSITE WING STRUCTURE

Leadership

In the new organization we will eventually see the segregated form of hierarchical leadership end. Process experts will assume the roles of coach, guide and facilitator and will have vast knowledge of the airpower delivery system. The playing field will be level fostering partnerships and removing barriers such as fear, mistrust and unhealthy competition.

In the new organization, coaches use customer data and team input to develop organizational processes. Process capability data, team and customer input will provide the foundation for the wing plan. The plan is the vehicle to transport the wing to a desired future state...worlds most respected Air and Space Force! Throughout daily operations, the team performs the processes and the coach observes the system, together they continously adjust the process to peak performance. Coaches have profound knowledge of the systems key components such as planning assessment, process expert training, conducting air operations, and maintaining air vehicle systems.

In the new organization, guides will possess the skills to consistently and effectively communicate the vision. For instance, guides use complex state-of-the-art network to conduct team meetings, daily interaction, and training sessions. In addition, the guide is responsible for communicating specific wing goals and objectives the team must meet to satisfy mission requirements. All combined, the guide provides the team with knowledge, authority, and organizational support to take action in accordance with the goals and objectives. Shared information, decision making at the process expert level, and vital resources (like tools/technology) are examples of such.

In the new organization, process experts facilitate frequent team building sessions designed to optimize cohesiveness, keep the team moving on the same course, and maintain healthy and positive behaviors. The facilitator will take measures to prevent individualistic behaviors from disrupting the teams synergy. For instance, process experts facilitate positive team behavior by creating reward systems based on system performance, customer satisfaction, and continuous individual and process improvement.

The new organizational structure requires heavy leadership involvement that can be achieved by practicing the roles of coach, guide and facilitator. These roles will be prevalent as leaders strive to provide an environment where mentorship is the primary vehicle used to grow the next generation of leaders.

COMMUNICATION AND INFORMATION TECHNOLOGY

In the 21st century wing, information technology will be the very apex of airpower. Without the proper input of customer, competitor and environmental data vital output information cannot be produced for consumption by the air power delivery process. For example a Customer Information Data System (CIDS) will collect, store, and analyze real time customer requirement data, competitor data, and global environment data through the use of satellite downlinks and complex ground laden computer networks (i.e., milnet).

The wings primary computerized decision making systems (CDMS) receives CIDS and milnet data. CDMS neural network continuously compiles the data into information products for the wing. Output products—such as strategic and operational plans, systems training, process performance standards, and air / ground operations scenarios—from CDMS provide direct input to the process experts and equipment of the air power delivery process. In turn, CDMS receives input such as planning, training and air operations effectiveness data directly from wing processes. The difference between CDMS output and wing process performance input results in real time computer based assessment (CBA) for use by process experts to maintain and control the wing's system. This information will be available everywhere in the organization resulting in real time data used to manage by fact (see figure 5).
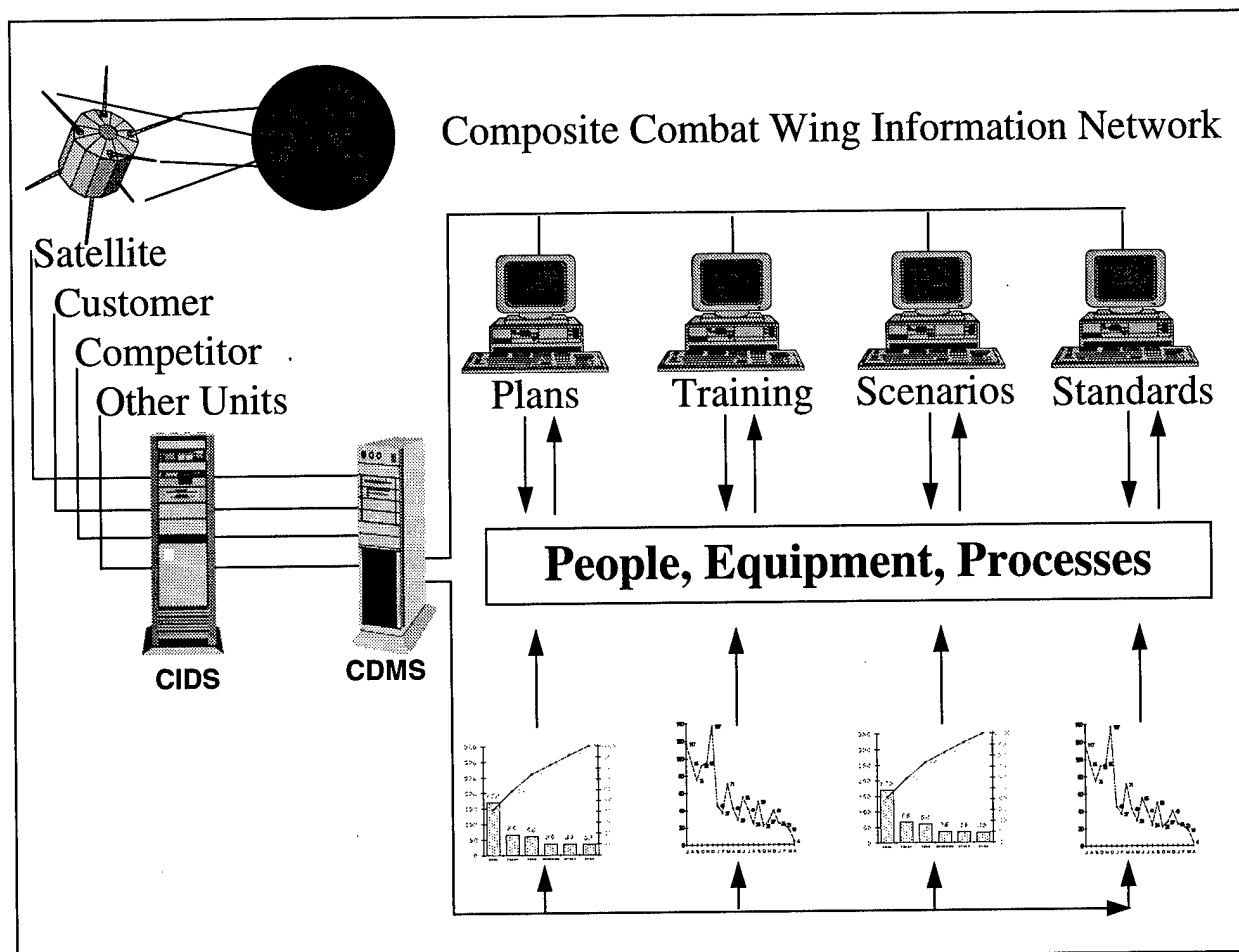
Figure 5: the new composite wing information network structure, input, process, and output

The information network in the new organization facilitates easily accessible, real time data and information throughout the wing. Information such as process performance standards, improvement goals and objectives and feedback data from CBA is accessed by team members to perform their primary tasks to accomplish the mission. By acting upon CDMS data and information, process experts can input feedback of actual system effectiveness back into the system...both validating computer system accuracy and wing system effectiveness. This internal communication process coupled with the steady stream of external CIDS information allows CDMS to continuously adjust performance standards—optimizing the wing system to provide air power.

On the hand, the information network allows for maintenance of high performance human resource work systems. CDMS accepts requirements from process experts. Requirements include training needs, satisfaction and motivation levels, recognition and compensation desires, health, safety and ergonomic information. CDMS balances internal and external customer requirements and produces a useful human resource development and management plan optimized to improve flexibility, innovation, education, training, development, compensation, recognition and overall team satisfaction.

314

Airpower Delivery Scenario

In the 21st century the Air force will be equipped with remote control combat vehicles (RCCVs). The process begins with a mission capable RCCV. Next, via the process described above, CDMS uploads the mission plan (air operations performance scenario) data into the aircraft intelligence unit of the RCCV. Simultaneously, the RCCV driver and process experts receives computer based just in time training on the specific mission plan. Next, the driver stationed at a remote control console launches the RCCV to perform the planned scenario. The launch sequence initiates the real time aircraft monitoring system (AMS) which continuously transmits data to CDMS. Using ground cockpit instrument panels process experts monitor vitals RCCV performance statistics from taxi to recovery. Real time AMS data is used to determine RCCV mission capability. If RCCV is fully mission capable the RCCV is placed on the re-generation line. Non mission capable RCCVs are taxied to pre-positioned process experts who troubleshoot and repair the RCCV. This airpower delivery process captures vital trend data on all aspects of mission effectiveness, RCCV systems performance and work process efficiency generating daily inputs to the centralized wing improvement opportunity root cause analysis system.

Summary

The current hierarchical organization is a "boss centered" environment where unhealthy competition, fear, and mistrust are the primary components that form the organizational culture. As demonstrated, the new "process oriented" organization is a customer focused environment where technology and innovation fosters team work, trust, and continuous improvement...the building blocks of the 21st century composite wing. Restructuring composite combat wings around core processes is the only way the Air Force can continue to meet future mission demands remaining the best aerospace force in the world. This reengineered structure will increase mission effectiveness, over all performance, satisfy the customer, and will save American taxpayers dollars. We owe it to our nation to find better ways to fly, fight, and win!

Feedback

We'd like your feedback. Please contact us via electronic mail at the following addresses: whalenj@server.kic.or.jp OR gainesd@server.kic.or.jp.

What did you think about this paper?   *Exellent*   *good*   *fair*   *poor*

What is the single most reason you answered the way you did?

Works Cited

Hammer, Michael & Champy, James. <u>Reengineering The Corporation.</u> New York: HarperCollins Pulishers, 1993.

Hammer, Michael & Stanton, Steven. <u>The Reengineering Revolution.</u> New York: HarperCollins Pulishers, 1995.

Cortada, James. <u>TQM For Information Systems Management.</u> Mc Graw-Hill, 1995.

Repackaging The Strategic Planning Model To Encourage Quicker Understanding

Capt Marci Townsend

Capt Marci Townsend is a MAJCOM Quality Advisor at Headquarters Air Combat Command, Langley AFB where her current passion is strategic planning. Her background is in command and control and C-130 current operations. She received a BA in Russian from the University of Southern California and an MS in Management from Abilene Christian University. Marci is currently working on her Ph.D. in Administration/ Management through Walden University.

Repackaging The Strategic Planning Model To Encourage Quicker Understanding

Capt Marci Townsend
HQ ACC/QI

Abstract

Strategic planning is essential in helping organizations to respond to the accelerating pace of change. Unfortunately, people are turned of by models which make the process appear more complicated than it is. Whatever is used to depict the planning process should not scare people away from planning. In an attempt to help "market" the strategic planning process and make it easier to understand and use, ACC has done some "rearranging" to the current planning model and created a four-step model. This model depicts essentially the same steps as the 11-step model, but has grouped them together differently. This version of the model has proven easier to market to individuals being exposed to the concept of strategic planning for the first time.

> *Why bother with strategic planning?*
> *"Would you tell me please, which way I ought to go from here?"*
> *"That depends a good deal on where you want to go," said the Cat.*
> *"I don't much care where," said Alice.*
> *"Then it doesn't matter which way you go," said the Cat.*
> Lewis Carroll, <u>Alice in Wonderland</u>.

Introduction

If we don't think about where we want to end up, it will be impossible for us to figure out how to get there. Effective strategic planning is necessary to be able to deal with the future and whatever changes may be in store for us. Strategic planning does more than help us plan for the future, it allows us to create our future. When members of an organization come together to think about their future, they begin laying solid foundations for their own version of the future.

Too often, strategic planning is treated as an annual paperwork exercise which has no effect on the way we actually do business. (Other than the fact that it frustrates the individuals who devote so much of their time to creating a product that only sits on a shelf.) No one ever promised that strategic planning would be easy, nor that it would guarantee success.

If implementing strategic planning is so difficult, and takes so long, what incentive is there to do it? One important reason is that strategic planning helps organizations and individuals adapt to change. Change is not only certain, it is occurring at an accelerating

318

pace. More than 80% of our technological innovations have occurred since 1900. Furthermore, it is predicted that the last fifteen years of this century will see at least as much technological change as the first 85! We have to be able to adapt to change more quickly than our ancestors did in order to just survive. But we need to do more than just adapt to change. We need to proactively decide what our future will be and shape it.

Linking Planning and Unit Self-Assessments (USA)

Quite simply, we need to ensure everyone is focused on the mission and continuously improving performance. To do that best, units need to have a "plan" to improve and "assess" their performance against that plan. The role and challenge in this effort for leaders is provide clear guidance, to align efforts towards common goals, and to assess performance against those goals.

The next challenge is make the "process" as quick and simple as possible. We have to get away from making USAs a "square filler" that competes with getting the mission done.

There is a simple construct to this process:

1. Leaders provide the Vision-Mission and Goals for their organization.

2. Our people, the process owners, develop the performance/action plans to achieve the goals.

3. Leadership and membership assess performance against the unit goals, throughout the year.

By following this construct, the USA is clearly linked to the strategic plan and assessment becomes an on-going, continuous process that is clearly related to producing results and achieving the unit's mission. The net effect should be: Everyone knows where the unit is going, everyone is involved in getting there, and everyone knows how well you're doing along the way.

Strategic Planning

In an attempt to make the strategic planning process easier to understand and use, ACC has done some "rearranging." This four-step model depicts essentially the same steps as the 11-step model, but has grouped them together differently. This presentation provides a simpler method with which to introduce the planning model to people for the first time. When presented in this format, students have expressed that they had an easier time grasping the concept of planning. It is much like going to the mall and trying to find the bookstore. The first thing you do is go find a map and look for the "you are here" arrow.

(Phase 1 - where we are) Then you find the bookstore on the map (Phase 2 - where we are going) and figure out how you well get there (Phase 3). If you get lost along the way, (Phase 4 - How are we doing) you would then stop and do the whole process over again. Using this format makes it clear that strategic planning is not rocket science and makes a great deal of of sense.
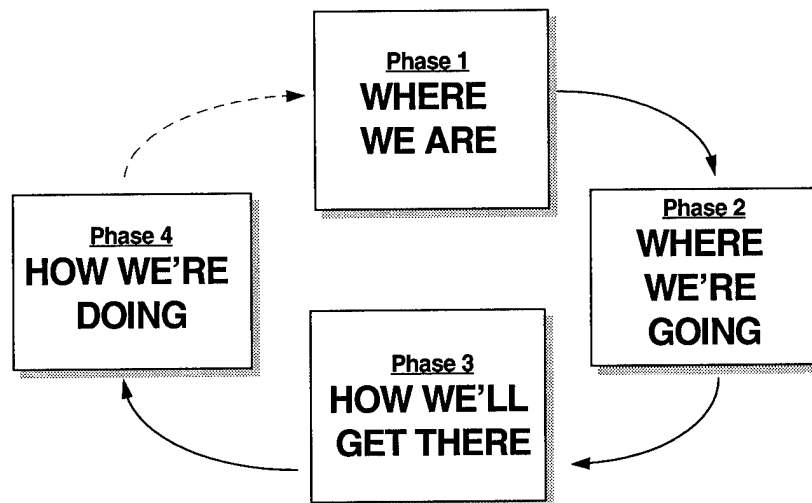
```
              ┌───────────────┐
              │   Phase 1     │
        ┌ ─ ─▶│   WHERE       │─┐
        ╱     │   WE ARE      │ │
       ╱      └───────────────┘ ▼
┌───────────────┐        ┌───────────────┐
│   Phase 4     │        │   Phase 2     │
│  HOW WE'RE    │        │   WHERE       │
│   DOING       │        │   WE'RE       │
└───────────────┘        │   GOING       │
       ▲  ┌───────────────┐ └───────────────┘
       │  │   Phase 3     │  ╱
       └──│  HOW WE'LL    │◀─
          │  GET THERE    │
          └───────────────┘
```

Figure 1

This model incorporates some of the best words on strategic planning which were offered by a man who probably never even put the two words together. *Abraham Lincoln said, "If we could first know where we are, then whither we are tending, we could then decide what to do and how to do it."*

Phase 1 - Where are we now?

Before you can figure out where you want to go, you need to figure out where you are. This is essential to setting goals that are within your capabilities and to focus on the right priorities to be able to accomplish your mission successfully.

Plan to Plan

This step takes care of the "nuts and bolts" of how the planning process will take place. What will the schedule be? When? Where? The definition of roles. A plan is created to train all of the participants. A timeline for the process is created which takes into account all other important events impacting the unit. Finally, a process is set up to get the word out, not only on the senior leaders support, but what the review process will be. It is also a good idea to keep everyone updated on the progress that is being made on the plan.

External Scan

External Scanning explores the issues which are likely to impact the organization in the future. Leaders should explore a variety of issues which are outside their realm of control but could either enhance or inhibit the mission of the organization in the future. At this point you look at what has just happened in these areas to see how they could impact your organization.

COPIS Update

In all units, mission accomplishment is paramount. The COPIS is the "big picture" that tells us what the key elements of the mission are, what we do, who we do it for and how we get it done. A good COPIS is 100% mission oriented. Once all of these elements are identified, they need to be *prioritized*!

Phase 1
WHERE WE ARE

PLAN TO PLAN

EXTERNAL SCAN
(FORCE FIELD)
• THREATS
• OPPORTUNITIES
• FUTURE OPERATING
  ENVIRONMENT

COPIS UPDATE

INTERNAL SCAN (USA)
• CURRENT CAPABILITIES
• KEY PROCESSES
• ACC STANDARDS

Figure 2

Figure 3

Customer Output Process Input Supplier

Customer

Outputs

Requirements

Process

Inputs

Requirements

Supplier

Feedback

Measurement System

Figure 4

321
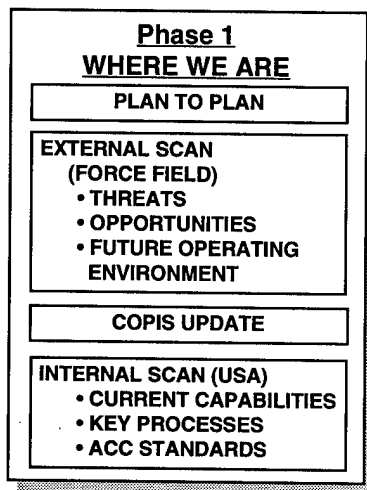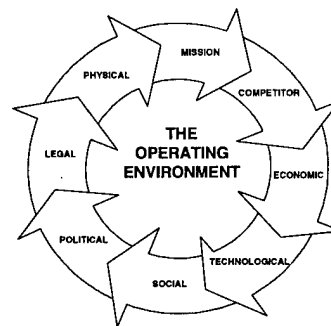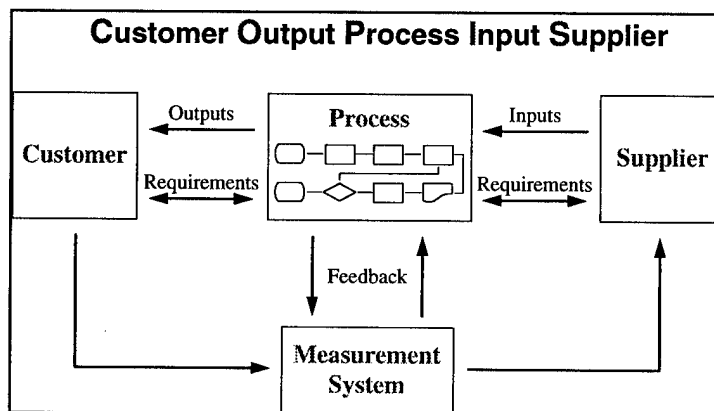
What is a COPIS?

- It identifies customers, outputs (key products and services), processes, inputs, and suppliers (COPIS), at all levels of the organization
- It ties into the organization's strategic plan; its mission, vision, goals and objectives
- It articulates senior leadership's concept of the future of key products and services and establishes priorities

One of the other benefits of the COPIS is that it gives the unit a very good start on their self assessment as shown by the related categories listed in the table below.

COPIS
(CUSTOMERS, OUTPUTS, PROCESSES, INPUTS, and SUPPLIERS)
Top line is for EXTERNAL areas/items and second is for INTERNAL areas/items.

1. Key outputs- Products and services delivered to customers	2. Key customers- The org's key customers (segmented)	3. Key internal indicators- Internal measures that predict customer satisfaction	4. Key customer satisfaction indicators- Satisfaction measures obtained from customers	5. Key processes Organizational processes that produce and/or deliver output (List your key process owners after each process - 5.2.2 & 5.3.2)
5.1, 5.2	7.1, 1.1	5.1, 5.2	7.3, 7.4	5.1, 5.2
1.0, 4.0	1.0, 4.0	5.3, 4.0	6.3	5.3
6. Key process indicators/Quality Indicators- Measures that track process quality and performance	7. Key data systems- Methods to collect, analyze and use organizational data	8. Key inputs- Resources provided to the organization from the supplier	9. Key suppliers- The organization's key suppliers	10. Key methods/ indicators to ensure supplier quality-Methods the org uses to communicate with suppliers and specific measures of input quality.
5.1, 5.2, 6.1, 6.2	2.0	5.1, 5.2, 5.4	5.4	6.4
5.3, 6.3	2.0	5.3, 5.4	5.4	6.4

Table 1

Internal Scan

One of the benefits of strategic planning provides an opportunity to integrate all of the data the organization already collects. There are several sources already in place to help you complete a thorough internal scan and most of should be included in your USA if it is thorough. The USA is a self assessment based upon the Malcolm Baldridge Award criteria. The USA document itself is merely a snapshot in time. It identifies your current situation and performance levels and it is a frame of reference for leadership to determine where and how much they need to improve. In the past, some kept the USA completely separate from strategic planning. Actually, unit self assessment should not be separate from strategic planning, but an important part of determining where you are.

The unit self assessment consists of seven different categories which work together to improve the organization as a whole. The driver in the organization is not the leaders, it's the mission requirements which come from the given mission. Leaders are the enablers, responsible for developing people and training them to trust, motivating them, and rewarding their performance. You need to set specific goals and objectives to capture the right information to improve the way we do the work — the processes to produce results that are predictors of mission accomplishment.

ACC TEMPLATE FOR PERFORMANCE IMPROVEMENT

Figure 5
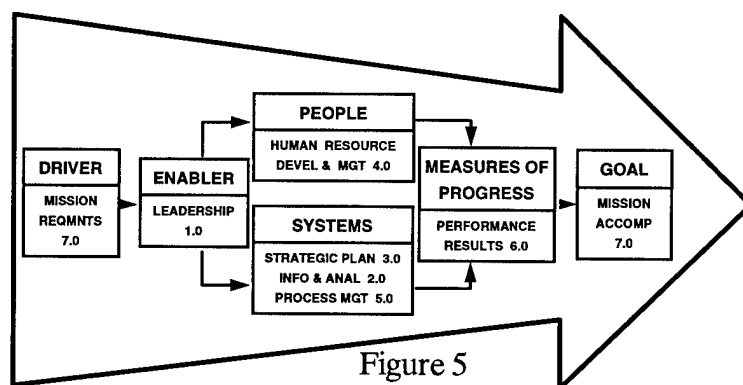
Phase 2 - Where are we going?

In the second phase of the planning process leaders present an image of what the organization could achieve if it reached its full potential. They also define the behaviors everyone should cherish and uphold as well as the organization's reason for existence. The vision, mission and goals developed in this phase are three deliverables provided by unit leadership. When this phase is completed, leaders and workers alike should understand what their organization "is all about" and be inspired towards accomplishment of the mission as a team.

Figure 6

323
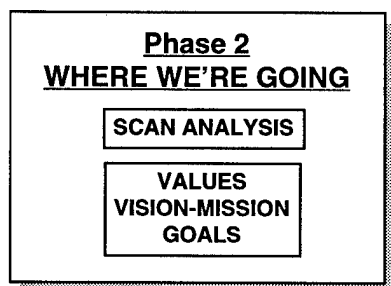
This stage requires a great deal of creativity to be inspiring, but also needs to remain focused on the unit's mission and COPIS and the information gathered in the internal scan. Because of the great deal of creativity required in this stage, it can be the most frustrating and least satisfying to complete. Too many units have struggled with this task and come away with vague, fluffy, meaningless statements. Or else they simply restate the obvious. For your strategic plan to be powerful and meaningful, the tasks in this phase need to be grounded in reality, yet innovative and forward thinking.

Scan Analysis

In this step you determine which threats are most critical and which opportunities are most plausible by using something like a force-field analysis and the information gathered during Phase 1.

The force-field allows you to determine if you have the strengths necessary to go after an opportunity and be able to win, or if a very urgent threat has several weaknesses and needs to be tackled right away. List the results in order of priority and use them to make your goals.
Values

An organization's values provide a needed anchor in an environment that is constantly in flux. Values should be the foundation for leaderships' decision-making process. A visible value system is essential. Leaders can't dictate a value system, they must be the value system. In order for the organization to buy into a set of values, leadership must model those values for everyone around them.

SAMPLE
Threat/Opportunity Force Field

big Weakness
|++++++++++++→

big Strength
←++++++++++++

Weaknesses   **Strengths**

little Weakness ++++→

←++++ little Strength

Tick marks = score from prioritization matrices (use a ruler)

Figure 22-7

Vision

A vision or vision statement declares for the membership what the desired future state of the organization should be. Vision statements should be inspiring and memorable — not fluff! The Air Force's vision builds upon our heritage but it also lets us know what the USAF's broad future goal is, as well as how every Air Force members contributes to it. Senior leaders must keep future mission requirements in mind and the external scanning

324

factors (Threats and especially Opportunities) which were identified in Phase 1, when envisioning their organizational future. Just continuing to meet mission requirements won't be enough 5 to 10 years from now.

Mission

A mission statement describes an organization's reason for existence. Mission statements are broad and expected to remain in effect for an extended period of time. Change in your mission statement is evolutionary rather than revolutionary as it is the foundation for what you are all about. Birnbaum suggested thinking of your mission statement as being like the Constitution of the United States — you *can* change the Constitution, but not quickly. (1990)

Mission statements have two purposes. First a mission statement identifies what the overall mission of the organization is to the members of the team. Secondly, the mission statement provides the framework for specific "action related" goals, objectives and performance plans developed later. If an activity does not directly link to the "mission" then it shouldn't be a part of the performance plan.

Birnbaum (1990) told a story about how inspiring a mission can be for individuals. Three bricklayers were working side by side and were asked what they were doing: the first says "I'm laying bricks." The second one says "I'm working to feed my family" and the third says "I'm building a cathedral." The third bricklayer understood his mission. He was involved in and energized by a task that transformed the actual work being done into an achievement that was greater than what he alone could produce.

The criteria for a mission statement are simple. First, organizations need to consider the makeup of their organization (Who are we ?). Second, in general terms, organizations need to identify the reason for their existence (What do we do?). Next, who is/are the significant customer(s) of the organization's mission output. (Who do we do it for?) Finally, how do we want people inside and outside the organization to view us and our mission. (How do we want to be perceived? or How do we do the Mission?)

Most units already have a mission statement and just need to make sure it is still in line with what they are doing. To create or revise a mission statement have everyone on the planning team answer the questions above in three minutes or less. (Have them answer quickly so that the respond with their gut feeling — this should not require too much contemplation.)

Senior leaders should consider their organization' s distinctiveness, heritage, location, etc. when developing a mission statement. Mission statements don't necessarily need to be statements as the 7th Wing's mission statement shows. Use whatever does the best job of conveying the message to your unit.
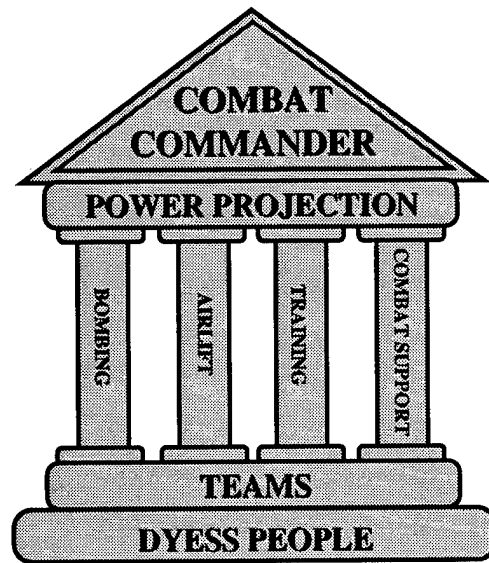
7TH WING MISSION

Figure 8

Vision-Mission Statements

Some units may find it helpful to combine their vision and mission into one statement. This makes it easier to remember and saves time when planning. It can also be useful down the squadron level and below. To create a combined statement, simply tack the vision onto the mission. In this case you would say: who you are, what you do, who you do it for and how well you want to do it in your ideal future. Once again, do what works best for the unit!

Goals

Goals keep us from standing still. They move us forward and make sure that we will stay a few steps ahead of whoever we may face. To do this, goals should be both motivational and directive. If everyone really has a stake in the mission and its outcome, then everyone has to know specifically what is most important to accomplish. Goals provide that direction.

Goals also tend to be longer-term in nature. Experts disagree: 1 - 2 years, vs. 3 - 5 years or further out. It is very important that goals are derived from the mission and the results of the internal scan, external scan and gap analysis completed previously. The threats and opportunities which were identified as "Urgent and Important" should be primary considerations in the development of goals IF AND ONLY IF they match key things in the COPIS and Mission. Since goals are longer term, they should not necessarily change every year. Use the initial scan analysis to see if they need to change this year or not.

Goals are important because they guide the entire unit's initiatives and movement in the same direction. By cascading goals down to the various layers of the organization and asking for feedback will help senior leaders determine the feasibility of the goals they're considering.

Phase 3 - How are we going to get there?

Up to now, the planning process has focused on senior leadership's role. The "How are we going to get there?" phase turns to the mid-level leaders within the organization. (This is usually squadron level leadership.) These leaders take the goals chosen by the senior leaders and develop objectives that are measurable and quantifiable. Once these objectives are written, performance action plans are created to meet them.

Phase 3
HOW WE'LL GET THERE

GAP ANALYSIS

OBJECTIVES
MEASURES &
MILESTONES

**PERFORMANCE
PLANS**
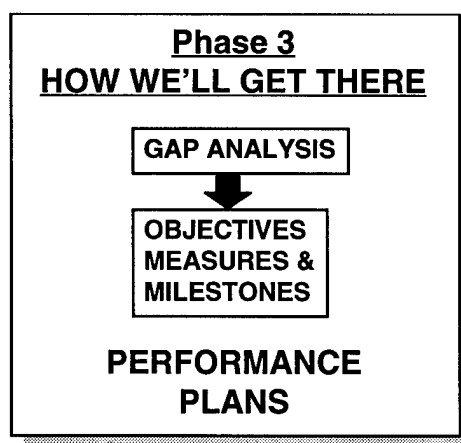
Figure 22-9

Objectives

Objectives are the lynch pins that translate goals into real action. They should definitely be quantifiable while still being motivational. They drive what the organization will measure and exactly where and how much you will improve. This is a challenging step, but should not be taken lightly.

How are objectives developed? Start with the higher level goals and decide exactly how the unit can support that goal in specific measurable terms. This requires another gap analysis that shows how far away your unit currently is from that goal. Prioritize your list with your mission and COPIS in mind, and then draw the "can-do-this-year" line. Make objectives and performance plans based on the items above the line.

Objectives are where linkage becomes important. The simplest way to ensure linkage is to adopt higher level goals and write supporting objectives. Objectives should also be "in concert." Once you are done writing all of your objectives, it is time to hang them all on the

wall at the front of the room and take a long hard look and ask again, "Can we *honestly* do *all* of these at the same time?"

Measures

If objectives are going to be measurable, there must be measures to track progress toward achieving the objective. Metrics are these measurements and they do two things. They can both stretch and sustain our performance by improving not just effectiveness, but efficiency too.
Effectiveness is completing your mission the way the customer requires, while efficiency focuses on using the most cost effective means (less money, less people) to do your mission. If you can do your mission more efficiently, you will have more resources available for training, increasing effectiveness.

The important thing is to not hide measurements away! All workcenters should have the metrics that tell them how they are doing posted prominently in their section. This does not need to be a fancy poster made by graphics. Metric displays which are filled out by hand, say at the end of the day by the person who does the job, will be much more effective than building a "measurement digest" that is only seen by senior leadership, several months after the data has been collected.

Performance Plans

Performance plans are specific methods for getting results. These are what link day-to-day activities to the unit's mission, vision of the future, goals and objectives. By taking the time to document what is required to achieve your goals, all unit members will be able to consolidate their efforts. A performance plan should meet the needs of the unit and may need to be detailed or very simple. At a minimum, a performance plan should posses the following:

- Instructions dealing with how to do the required tasks and what they are
- Roles and responsibilities (who has to do what?)
- Milestones (by when?)
- Metrics (how will we know how we are doing?)
- Resource identification (what will we need that we do not have now?)
- Feedback mechanisms (who/what will let us know how we are doing?)
- Success criteria (how will we know when we are there?)
  Whatever format is selected, it should be something that is easy to use and understand.

Phase 4 - How are we doing?

Implementation is the real work of strategic planning. Probably 85 to 90 percent of your time, work, effort, and tears will be involved in the implementation of your plan. Although developing a strategic plan/document is an obvious first goal, the only true goal is ensuring its successful completion. Organizations need to use a systematic approach to assess the success of implementation.
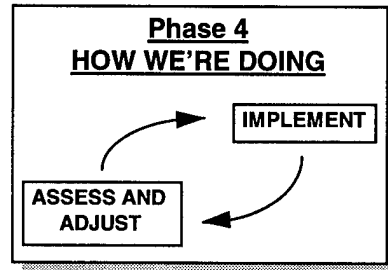

Figure 22-10

Assess And Adjust

Organizations need to use a systematic approach to assess the success of implementation. In this phase, leaders review and adjust the strategic or performance plans at the appropriate level. Based upon the measurements of success and/or changes in the operating environment, the organization will reassess its planning process and make changes or improvements as necessary. As much as possible, this review should be made a part of reporting systems and meetings that are *already* in place. You will be busy enough trying to implement your plan, this is not the time to add on another meeting or create a new reporting system.

This is the phase where most of leadership's efforts should be. So much effort should be here that the term "strategic planning" is misleading. It should be called "strategic leadership" because the important part is leading by the plan — not just creating it.

Conclusion

Strategic planning and strategic leadership (the day to day implementation of the strategic plan) are the two most important, never-ending jobs of leadership, especially senior leadership. The real test of the final implementation of the strategic plan is the degree to which leaders and other members of the organization use the strategic plan in the day to day decisions on the job. Ideally everyone will pause to consider whether a proposed solution is congruent with the organization's strategic plan. This "repackaging" of the strategic planning model should go a long way in helping organizations to understand, conduct and

implement strategic planning. If we want our organizations to exist into the future, we need to plan for it today.
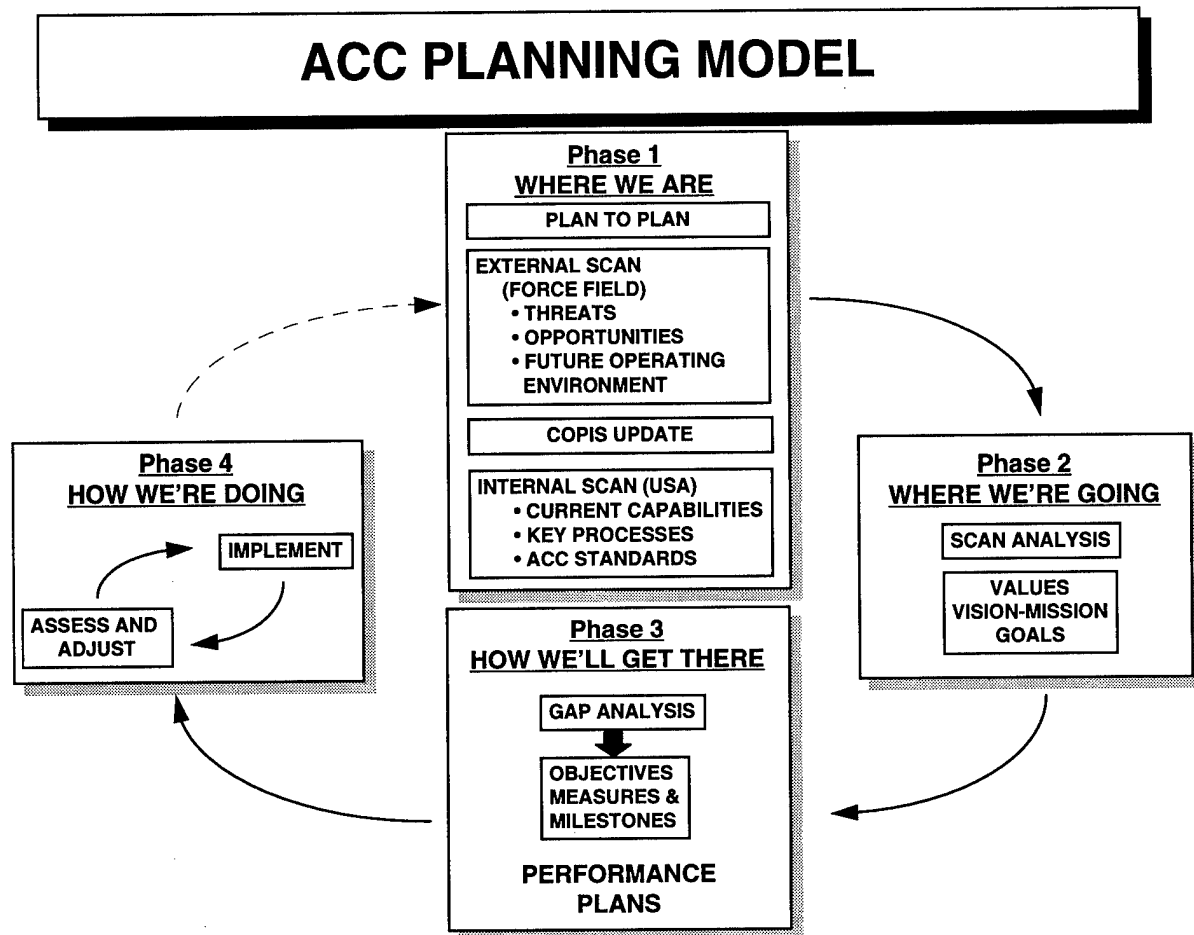
Figure 22-11

References

ACC Strategic Planning For Performance Improvement (PLANNING) Course. (1994, 5 October). Langley Air Force Base, VA: Air Combat Command Quality Improvement.

Albrecht, K. (1994). The northbound train: Finding the purpose, setting the direction, shaping the destiny of your organization. New York: American Management Association.

Barker, J. A. (1992). Future edge: Discovering the new paradigms of success. New York: W. Morrow.

Bean, W. C. (1993). Strategic planning that makes things happen: getting from where you are to where you want to be. Amherst, MA: HRD Press.

Bechtell, M. L. (1995). The management compass: steering the corporation using Hoshin Planning. New York: American Management Association.

Birnbaum, W. S. (1990). If your strategy is so terrific, how come it doesn't work? New York: American Management Association.

Carroll, L. (1974). Alice's adventures in wonderland and through the looking glass. Cleveland, OH: Collins World Publishing.

Naisbitt, J. (1982). Megatrends: New directions transforming our lives. New York: Warner Books.

Nolan, T., Goodstein, L., and Pfeiffer, J. W. (1993). Plan or die! Ten keys to organizational success. San Diego, CA: Pfeiffer and Co.

Inserting Customer Focus
Into The
Mission-Driven Military Machine

Capt Kenneth J. Baumer   MSgt Joseph P. Markowski

Capt Kenneth J. Baumer is Commander, 52d Maintenance Operations Flight, 52d Logistics Support Squadron, 52d Logistics Group, Spangdahlem Air Base, Germany. He leads a flight of 25 personnel in 3 elements who provide manpower and personnel, budget, depot-level repairable, engine management, and local area network computer support to the logistics group and 4 operational fighter squadrons. He is the NATO Partnership for Peace Military-to-Military Contact Program officer for the wing and holds a bachelor's degree in Psychology from the University of Montana, and is working on his master's in International Relations from Troy State University. Capt Baumer was commissioned through Officer Training School in February 1986.

MSgt Joseph P. Markowski is the Superintendent, 52 Logistics Group QAF Advisory Service at Spangdahlem AB, Germany. He has directed the implementation of QAF criteria, principles, and training for a Group of 6 Squadrons, with over 1600 people assigned since July 94. He is heavily involved in the Wing's strategic planning efforts and customer focus issues. Often times he augments the USAFE/QI and 52FW/QI staff by providing advanced QAF courses to include Team Leaders, Facilitator, Strategic Planning and Quality Advisor training. He is also a certified facilitator for the Covey Leadership Center in "the 7 Habits of Highly Effective People" and "Principle Centered Leadership", and is active throughout the Command. He will be transitioning into the position of Chief, IG Inquiries for the 52FW in June 96.

Inserting Customer Focus
Into The
Mission-Driven Military Machine

Capt Kenneth J. Baumer
MSgt Joseph P. Markowski, III
52 FW, Spangdahlem AB, GE

Abstract

The 52d Fighter Wing, located at Spangdahlem Air Base, Germany, is the largest and busiest wing in USAFE. Being stationed "at the tip of the spear" has its professional challenges and drawbacks for the "quality geeks." An attitude of "bombs on target, on time!" is a way of life. Taking time out to integrate a "quality focus" is tough to do. Here, you do what needs to get done as quickly and professionally as possible.

This article explains how the 52d Logistics Group "broke the code" on implementing a customer focus into its day-to-day activities, while supporting an operations group whose tempo is like no other in the Air Force. To do so we had to modify or break many paradigms on the importance of meeting and/or exceeding customer requirements and satisfaction indicators. Our Customer Focus Team was formed to help educate and give direction to the logistics group's Quality Council. They needed to know the customer aspects of our current capabilities and to that end the inputs received were many and valuable. These inputs not only gave the group a situational awareness, but put the group on track toward improving a host of processes. We also had to educate the customer on our process capabilities, knowing that sometimes customers can ask for too much. This gave new meaning to the term "stakeholder," a word few understood or took seriously prior to our efforts.

The result of our customer focus efforts not only include greater customer satisfaction, reduced time cycles, and less rework, but also a user-friendly data base and presentation format (designed in-house) that allows stakeholders to track and understand the status of customer concerns at a glance. We believe this is technology and innovation at its best!

Our Story

In the 52d Fighter Wing's Logistics Group, the concept of "customer focus" has taken on a different meaning since the Quality movement. Although one could say the group has always been conscious of doing its best for the customers, the concept of customer focus took on a life of its own in 1995. This is the story of how the 52d Logistics Group of Spangdahlem Air Base, Germany, found its strategic planning direction by focusing on its key customers who have an operations tempo that is second to none anywhere in the today's Quality Air Force! We put this account together to help you in your Quality journey. You may want to use the same techniques we did. We encourage that. You may do it a bit differently as you learn from our experience and then mold it somewhat to fit your particular needs. That is what the Air Force's Quality Symposium is all about.

Quality is a journey—a never ending quest to be the best you can be. For every organization there are a myriad of ways to deal with the problems and issues that arise daily. Unfortunately for us as customers, it seems the default viewpoint of many "not-for-profit" organizations is one of parochialism and protectionism. Since these organizations are not directly dependent for their livelihood on the people they serve, this viewpoint is all too common in the public sector. It has become a mindset with many organizations and this mindset needs to be broken. That is the core reason why we do Quality. You know you have traveled far along the Quality road if your organization is motivated not necessarily by what is best for it, but rather by what is best for its customers and its parent organization. (In this case, the wing as a whole and the Air Force in general.) It seems to be a hallmark of great companies and leaders to have this built-in sensitivity to what the customers need and what the vision is for the future of the industry and that company.

Examples are the efforts of Dun and Bradstreet's chairman Charles W. Moritz, who states that creating a culture that is customer focused is the responsibility of leadership and the organization. Creating a customer-focused organization begins by looking at every organizational unit at the lowest level.[1] Also, Robert W. Galvin, Chairman, Motorola, Inc., believes that championing a customer focused quality program is hard work, but the results are exhilarating. He states, "Every organization has a secret weapon—its customers." These beliefs govern our progress and our possibilities for the future.[2]

Thus, one of the most mature and most constructive ways to look at issues which arise to challenge your organization each day is from the point of view of your customers while simultaneously keeping the bigger picture in mind. You could say it requires an "out of body" experience to see things objectively and forward-looking. It is this kind of objectivity that a mature, sagacious leader will lead with, while always keeping what is best for the people in mind.

The 52d Logistics Group (LG) was in the middle of strategic planning. Between analyzing the mission and assessing current capabilities, it became apparent to the commander and members of the quality council (which consists of all the group's squadron commanders and a mixture of squadron officers and senior NCOs) that in order to know where to go, the

group had to know where it was on the road map of its Quality journey. And in order to know where your organization is on that map, you have to take an objective look at your surroundings, or in other words, observe the environment. Using an analogy; if you were driving in your car and found yourself lost, the first thing you would do is to observe the environment for clues as to your whereabouts: signs, landmarks, or whatever. If that failed or you wanted to be more sure about where you were, what would be the next obvious plan of action? Ask someone of course! Hopefully, it would be someone native to the area or who knew where they were. Similarly, the logistics group was in a new environment with Quality and not sure we (the quality council) were reading the signs accurately. In official strategic planning terminology, we needed to accurately assess our current capabilities in order to move on to analyze the gaps between where we were and where we wanted to be. In other words, we needed to know how well we were meeting our customers' current expectations before we could develop goals and objectives to meet the needs of a predetermined future state. What we needed was some objective feedback about our current situation so we could assess more accurately where we were in order to better gauge where we wanted to go. So, the quality council determined the best way to find out where we were was to ask the natives (read: top two external customers, operations group and support group) where we were. Where exactly was the logistics group on its Quality journey in terms of doing the job of meeting the needs of our customers? We wanted feedback from the people who depended upon the logistics group for support in order to more accurately assess our current capabilities. By our reasoning, once we understood more fully where we were as a group (by talking to the customers), we could then more accurately be able to plan our route into the future. But exactly what approach the group decided to take toward obtaining this understanding is the real story.

The formulated plan was based on a triple tier program. First, the LG executive officer, Lt Angelique Thies, and the LG Quality advisor, MSgt Joseph Markowski, would conduct the first round of customer focus meetings with the operations group (OG) and support group commanders and their respective squadron commanders (group to group). This would "break the ice" in the then frigid environment of Quality implementation at Spangdahlem. It would also "open the door" to the customer focus department that at times seemed closed and locked by previous management styles, and spark a desire to become customer focused in our "bombs on target on time" attitudes driven by the mission.

The second tier consisted of a "Group Customer Focus Team," made up of squadron members who would take the very broad group issues identified in the first tier meetings and aggregate them into meaningful areas of concern. This would allow the next level to get face to face with the true customers to establish requirements and satisfaction indicators.

The third tier, the squadrons and their work centers, could then get their hands dirty (work center to work center). The outcome would be two-fold: first, with requirements being identified, it would open up the lines of communication between the process owner and the customers. Second, the realization that the customer can and sometimes will ask for "pie in the sky" items or support.

The first tier meetings (approx. 1 1/2 hours each) consisted of an opening statement by the LG to show how important this initiative was. We explained our group's macro COPIS model to them, (Key Customers, Outputs, Processes, Inputs, Suppliers) and then asked seven questions. The first four focus on product/process identification, customer satisfaction, and gap analysis.

1. What products or processes does your organization receive from the 52 LG? What are the most important?

2. Of those products or processes, what are your requirements?

3. Is the LG meeting your needs?

4. The LG has identified several indicators we feel are important to our customers. Do you agree? Have we missed any?

The fifth and sixth help address gap analysis, self assessment and short term goal setting.

5. On a scale of 1 to 5, 5 being best and 1 being worst, how would you rate your satisfaction as a customer of the LG?

6. What can the LG do to improve?

The seventh question provided information for long term goals and better customer alignment.

7. Looking one to three years into the future, how do you envision your working relationship with the 52 LG? Consider issues like: cross functional teams, re-invented processes, joint planning conferences, etc.

The results were as follows:

1. Of the 10 key outputs and processes identified, we were meeting only 40% of the customer's needs. Most often our measurements were not customer related, and in fact were just "bean counting" to measure production rates.

2. The customer satisfaction rating was: OG - 2.40, Support Group - 3.08, or an average customer satisfaction rate of 2.77 out of 5.0.
3. There was a need to be more responsive to customer's needs and for opening the lines of ommunication.

The results were briefed during a LG strategic planning off-site. There were no surprises as to the outcome, though there was some disappointment in the lower than expected customer satisfaction score.

Time to insert tier two (squadron to squadron, lead as a group effort). What the council needed was a group of people who were willing and able to explore what was then uncharted territory on our Quality map, a team that represented every squadron in the group. This team needed to go out and continue the customer focus initiative by asking more detailed questions, probing every squadron the group supported. This team would be the eyes and ears of the logistics group quality council and attempt to do what the Quality council could not—obtain an objective, "out-of-body" look at the group from the customer's point of view. Thus, the logistics group's customer focus team (CFTeam) was born. Capt Baumer was chosen to be the leader because he had previous experience working with and facilitating teams, and there needed to be a link between the actions of the team and desires of the Quality council. Maybe being the lowest ranking officer of the Quality council helped, too, but in any case, his duties as the team leader were to devise the team's concept of operations (using the information gathered at the initial customer focus meetings) and to plan and chair the team's subsequent meetings. That link to the council was vital in order to prevent the team from floundering and perhaps taking off in a direction that was not productive for the purposes of strategically planning the future direction of the group. In order to represent every squadron fairly there were to be nine team members: the chairman, facilitator, and representatives from each squadron: the component repair squadron (2), contracting squadron, equipment maintenance squadron, logistics support squadron, supply squadron, and the transportation squadron. The reason for selecting two from the component repair squadron was because of the two distinct areas owned by that squadron—avionics and engines. It was difficult to find an available potential team member well-versed in both areas. The optimal rank of team members from each squadron was determined to be E-7 or above for reasons of knowledge and experience of the squadron and group key processes and outputs. They needed to be able to question the customer about the support we provided and help fix the problems we encountered. The people for the team were chosen by their squadron commanders and asked to be available for the long-term task ahead (forecast to last six months due to the current TDY commitments and ops tempo).

There was a danger here. The short-sighted might have seen this process as just an exercise in digging up tired, old issues. Those at the receiving end of the problems who were paradigm-bound might have looked at the issues and found it easier to hide behind regulations; using them to justify the perpetuation of problems while only solving a few token issues. The politically motivated may have seen some utility in just patching the surface of problems while proclaiming "we did good" and patting themselves on the back. We needed to put mechanisms in place to prevent these mistakes from happening. But the answers as to how to do that would not be forthcoming until the team had gathered all the inputs from the customers and was ready to present them to the council. At that point a systematic, Quality method of tracking was found and will be discussed.

Using one of Covey's "7 Habits of Highly Effective People," (first things first) developing a charter was in order to set the focus and direction of the team and to allow the Quality council to bless the concept and route the team took. Here is the purpose statement and boundaries from the team's actual charter as drawn up by the team members and approved by the process owner, the group commander.

337

LG Customer Focus Team
Charter

Purpose/Description:

The LG Customer Focus Team is chartered to: Communicate with LG customers and capture requirements; compile an interview questionnaire based on group external processes which support customers and issues brought about by contact team visits; and lastly, to serve as a catalyst to further develop our key processes. The LG Customer Focus Team will present its results to the LG Quality Council for use in subsequent strategic planning efforts.

Boundaries:

The team will delve into problems with associated key processes only to the extent needed for clarification. The team is comprised of representatives from each squadron in order to facilitate the clarification/identification of the issues. Expected completion date: 30 Sep 95.

Now that we had our direction defined, the details had to be worked out. How would we talk to the customer? What form would our questions take? Do we get our data through mail surveys or interviews? And who were the customers we wanted to get opinions from in the first place? That turned out to be one of the most important questions. We didn't want just any old customer. Although the focus of the team was to be the customer, it had to be the right customer, as we learned before. The squadron and group commander level was too high in the structure to focus on exclusively as customers. Those leaders might not know about all the problems the people in the squadron were dealing with every day which for various reasons hadn't bubbled to the top yet. On the other hand, we felt the worker level was too far down the chain. Those people, although experts in their processes, would be very hard to glean issues from. For one thing, there were just too many. In addition, scheduling meetings small enough to be productive would be a logistical nightmare. We was also felt that separating the wheat from the chaff at that level would be too time-consuming and the benefits not be worth the effort required. We finally decided on the flight level. In large squadrons the small, nagging issues would not be so insignificant at the flight level. Yet, the flight chiefs should be big-picture oriented enough so that the team wouldn't drown in minutia. So, our first attempt would be aimed at the flight chiefs. We invited squadron commanders early on in order to get their inputs and to add an air of legitimacy to our visits. Eventually, we dropped our request for the squadron commanders to attend not just because of constant scheduling problems, but because at the squadron level the personality of the leader often times dominated the atmosphere too much. We wanted the uninhibited participation of the squadrons. The meetings eventually ended up being the CMTeam and flight chiefs, squadron maintenance officers from operational squadrons, and in some cases, element chiefs too.

The next thing to decide on was how we would gather the data. That was easy. We wanted face-to-face meetings. An impersonal survey via paper or E-mail would never do as survey mania was alive and rampant and we feared the backlash. We needed to meet people face-to-face and convince them our group was seriously committed to fixing the problems they brought up. We needed to sincerely communicate that we were not just part of another self-aggrandizing effort, out to prove we were Quality personified. We didn't want another survey that people would just look at as a waste of time and not take seriously. This tied in with which customers we would survey. The only practical way to get inputs from the thousands of people we affect every day would be with a survey. Since we didn't want to do that, the group we had chosen was just small enough to meet with everyone, by squadron, personally.

Now that it was decided that meeting our customers at the flight level face-to-face was the preferred method, what type of meeting would be most effective and what would be the role of the team members at the meetings? What kind of structure and facilitation would it require? In our first attempts, the CFTeam met with customers and passed out a list of the key processes performed by every flight in every squadron in the logistics group. We then asked the squadron we were visiting about the previously captured inputs from tier one and any additional good and bad things they could associate with every process as we went down the list, page by page. Eventually, this technique was abandoned in favor of a more participatory method. We had the customers freeform brainstorm every process the logistics group performed for them. This got participants thinking logistics support and clarified any questions as to what services and products we did and did not provide. After a few minutes of brainstorming, they would frequently just get out a phone book and use it to jog their memories. And if they missed any processes, in the end the CFTeam members would fill in the gaps to ensure full process coverage. This took about the first 10-15 minutes of each meeting, but was a very fruitful exercise in getting the customers to see and understand who we were and where we were coming from. In many cases they had no idea the plethora of processes owned by the logistics group. Only the support group perhaps surpassed the logistics group in the many, varied processes performed by its people. Following that, the customers were encouraged to share their experiences, good or bad, in dealing with us and our processes. In the end, this is what the agenda looked like:

- Introduce team and customers
- Explain purpose/significance of the CFTeam
- Brainstorm key processes
- Brainstorm/discuss issues

The role of the team members was a more difficult area. Were they simply going to be data-gatherers, devoid of any input? Or how about the opposite extreme—actively questioning and explaining and perhaps rebutting misunderstandings and accusations that would arise? As you might suspect, we found the middle road the most productive. Following the brainstorming session, the team leader would then lead another more structured brainstorming session requesting remarks or issues dealing with any of the processes we owned as a group using the previously-brainstormed list of processes as an outline for our progress.

339

Even though the leader would write down a customer-approved synopsis sentence of the problem on butcher paper in the front of the room, the members of the CFTeam probed for more information regarding the issues relevant to their squadron. The name and phone number of a point of contact as a minimum was obtained as a place to return for more information. Sometimes, CFTeam members realized that more information than just a name and phone number would be needed by their squadron in order to help understand and solve the problem. We wanted no lack of understanding to hinder our efforts. Most team members used a checklist devised by the team beforehand to ensure the most pertinent questions got asked. Here is a sample of that checklist:

PROBLEM OPR (office/name/phone)**:**
PROBLEM (any supporting data?)**:**
CUSTOMER EXPECTATIONS/NEEDS:
RECOMMENDED SOLUTION:
PROCESS:
LG OPR FOR PROCESS:
RELATIVE IMPORTANCE TO CUSTOMER (on a scale of 1 to 10)**:**

Here was another danger. The members of the CFTeam had to be careful not to get defensive and take criticisms by the customers personally as we probed deeper into the issues for a better understanding. The customers we met with would sometimes take the opportunity to vent frustrations they may have felt with our processes. And that was very understandable considering the drawdowns that have affected everyone and have sometimes left support a bit short. Here is where you will find out who is truly customer-oriented not only in their work, but in their outlook on life. The CMTeam members needed to just absorb the criticism, be empathetic, clarify, and write the issue down. Later, the emotions could be sorted out from the facts. Trying to delicately handle these problems was dangerous in another way—it could have led to filtering out politically sensitive issues. We always encouraged every problem that was mentioned be written down (unless it was a misunderstanding or not our process) in order to give the LG commander a true feel for his customer's views. If we filtered things just because they weren't the most flattering comments about our processes, it would have been counter-productive. The council would not get an accurate picture of where we really were as a group in terms of our customer focus. So every issue, no matter how small, was recorded. A total of 136 customer focus issues were given to the group and squadron commanders.

Our third tier efforts (work center to work center) were most important. This is where the "rubber meets the ramp" in any organization's quality journey and for us was a critical hurdle to leap. This was the acid test to determine if we were ready to walk down the path of successful quality implementation or sit in the corner and color, hoping that someday we'd get it right.

This presented us with two sticky issues. The sensitive issue of making sure the issues brought before the council were dealt with in a methodical and Quality manner, and the other of putting into action the theories learned during quality council meetings, strategic

340

planning off-sites, and classroom sessions. There needed to be a method to ensure every issue was tracked and the progress recorded. This was also crucial to giving the council an overview of the problems. Only by viewing and being aware of the problems could they truly tell where their squadron and the logistics group as a whole stood in the eyes of the customer. To this end, a catalogue of the issues by squadron was put into a specially designed, user friendly Microsoft Word‰ 6.0 data base program (yes, it has data base capability) and given to the commanders. The squadrons were given the origins of the issues and encouraged to consult with the customer in this solution phase. This is a sample of the categories used in making the catalogue of issues:

Sample customer focus issue data base entry

Squadron: LGT   **Code:** TF2-34
Problem: Fighter squadrons need more forklift support during exercises/deployments
OPR: SMSgt Jane Doe - LGT/LGTO - DSN 452-1110
Key Process: Fleet Management
Start Date: 1 Jan 96   **ECD:** 31 Dec 96
Step in CIP: Identify Improvement Opportunity
Priority: 1 - Important - Urgent
Status: In work
Overarching issue: Base does not have enough forklifts because of past "fight in-place" mission. Re-evaluation of the current increased mobility mission may allow TA adjustments necessary for additional authorizations by HHQ
Remarks/Roadblocks/Proposals: Base level requests HQ USAFE TA review

The underlined areas are protected fields. This concept was used to ensure all process owners would follow a predetermined format, provided the squadrons a standardized briefing template, and allowed the program coordinator (the LG Quality advisor) to be able to easily track all 136 issues.

In this format the categories are mostly obvious. The **Squadron** is of course the responsible LG OPR squadron for the issue, with the office symbol, duty phone and name of the person responsible as **OPR**. The **Code** is shorthand for the squadron that brought up the issue, and which number issue it was. **Problem** is the exact wording the originating squadron approved for the issue during their brainstorming session. **Key Process** refers to the OPR squadron's key process, and the **Start Date** and **ECD** are estimates for starting and finishing the issue. Using a drop down menu, the **Step in CIP** refers to the AFQI 7 step Continuous Improvement Process model and identifies the step in the problem solving process the OPR squadron is currently at. **Priority** (another drop down menu) is a modified version of Stephen Covey's Time Management Matrix, which are variations on important, not important, urgent, and not urgent. The final drop down menu, **Status,** is simply an assessment of what is currently going on with the issue, whether it be in work, awaiting HHQ information, awaiting its turn on the priority list, or work complete / awaiting closure. The **Overarching Issue** is important. It was used to attempt to get the squadron quality councils, as they viewed each of these problems, to step back and take an objective, overall

look at the problem and use the 5 Why questioning technique to ensure the root cause of the problem was addressed. The sample case above (an actual problem), was an attempt to get the squadron to see that the forklift issue was more that just base-level whining about the shortages of forklifts. It was in fact a symptom of a much larger problem—a mission change without the resulting ramifications of that mission change being addressed and solved. **Remarks/Roadblocks/Proposals** is for comments, proposed solutions, or actions required.

All 136 issues gathered from the support and operations group squadron interviews were presented in this format. They were put in PowerPoint‰ 4.0 format, (using copy and paste options from the previous Word 6.0 program), and as stated before, presented a few at a time before the Quality council. The idea was twofold: to give all the members of the council an idea of the overall customer concerns and open the issues and their solutions up to feedback by the group leadership as a whole to ensure a good fix was applied before the issues were closed.

The commanders were told to take the problems back to their squadron quality councils and work the issues at the appropriate level and the appropriate forum, but bring them back to the Quality council regularly for review. They were then given a briefing schedule approved by the group commander so that each issue would be briefed in scheduled Quality council meetings a few at a time until all were addressed. Although the briefing process would take practically six months to do, the group commander emphasized two things. First, the solutions to the issues were to be formulated as slowly and methodically as necessary to adequately address each one. If a cross-functional team was required to arrive at a solution, then so be it. If a phone call cleared it up, then all the better. But there was no need to hurry through the solution phase. Second, the group commander was the only one who could approve closing an issue.

You might ask, "So how does measurement fit in with all this?" Well, we are in that phase of that issue now. Only those issues that easily lent themselves to measurement were measured. For instance, the contracting squadron found that they had not advertised their Impact Card program wing-wide very well because no one had heard about the program when they brought it up as part of their purchase request process. This was easily resolved with some timely articles and briefings to the leadership of the base and no metrics were deemed necessary. The sample problem above of inadequate numbers of forklifts for the fighter squadron may drive some simple metrics comparing forklift assignments by squadron across the wing or compared to similar wings in the Air Force. Then again, usage rate may be a player and have to be broken out in the future. There is a wealth of options available to the wing and we will not throw this opportunity away to classify our measures by what is important to the customer.

In closing, we offer this method to you of capturing customer requirements and moving your Quality council down the road toward that mythical land of Quality Nirvana. Bridging the gap between where you are and where you want to be will be a lot easier once you take an objective look at your processes from the point of view of those most affected by your processes —the customer. In addition, you will generate a lot of interest in QAF and buy-in from all the stakeholders as a result of the work centers having to talk to the customers and work on their processes. It provided a much-needed boost in the level of Quality activity in our group and hopefully will do the same for yours.

Bibliography

"Customer Focus: Key to Total Quality", In Search of Quality, p. 293 - 298, Executive Excellence Publishing, Prove, Utah

"10 Heresies of Quality", In Search of Quality, p. 25 - 32, Executive Excellence Publishing, Prove, Utah

SPECIAL EVENTS

"Project Quest"

Colonel Ana C. Konduris

Colonel Konduris is currently the Inspector General, Air Force Flight Test Center, Edwards Air Force Base, California. Prior to this assignment, she served as Chief, Executive Services Division, Office of the Assistant Vice Chief of Staff, Headquarters United States Air Force, Washington, D.C. In that position, she led the QUality Executive STaffwork (QUEST) Process Action Team chartered to streamline the HQ USAF's staffwork process. Today her insight and vision are leading the Headquarter's staffwork process into the 21st century. Her team developed an automated solution (called the QUEST Template) for correspondence preparation that allows the user to create correspondence quicker, easier and faster than ever before. Over 90% of all staffwork for the Air Force's senior decision maker is now done using the QUEST Template — without mandating it. Col Konduris also spearheaded the design, construction, and implementation of the Pentagon's first electronic problem solving room. No one has done more to enhance the quality of strategic planning and organizational restructuring solutions through the use of collaborative technologies.

"Project Quest"

Abstract

QUEST Template: In May 1993, the Air Force Assistant Vice Chief of Staff chartered a process action team (PAT) to simplify the Air Force Headquarter's (Pentagon) staffwork process. This process involves the preparation of correspondence for Air Force senior leadership. The team called itself QUEST – QUality Executive STaffwork. It was composed of crossfunctional representatives from the staffwork process. Some were traditional correspondence preparers and reviewers; others, functional experts (called Action Officers) who had lost their administrative support through downsizing and were now solely and wholly responsible for correspondence preparation. The team used a Quality methodology to arrive at their solutions. They collected data to determine the most frequently used formats and tested the prototype solution with a crossfunctional group of users to determine the look, feel, and flow of the solution. Built into the automated solution was a survey form to ease and encourage collection of feedback. One of the QUEST team's objectives was to develop automated templates for 6,000 users that: met diverse and detailed administrative requirements; reduced the labor intensity of correspondence preparation; minimized frustration, rework, and lost time. Since January 1995, there have been 3 releases of the QUEST Template (with another planned for September 1996). Today, 90% of all documents (over 8,000/year) for Air Force senior leadership are prepared using the Template and its automated formatting features. Microsoft Word was chosen as the platform to provide the solution because its use was widespread throughout the Headquarters. A set of integrated Word Wizards using Visual Basic and Word Basic were developed (as well as an installation utility) to aid the user in developing correspondence. These wizards ensured that all correspondence was properly formatted, enabling the user to concentrate on the content rather than the format of the document. Innovative ideas built into the wizards include:

- Database of signature blocks and associated letterheads
- Ability to computer-generate letterhead including seals and logos
- Forms that grow automatically as needed
- Full support for classified documents including caveats and handling instructions
- Extensive capability to capture and re-use default information about the user and his/her preferences
- User-defined lists to store often used information
- Ability to restart the wizard to make changes without losing any information

- Passing of information such as the subject from the previous document to the next, reducing user keyboarding requirements
- Built-in survey to capture additional user requirements

These features and others made it possible to achieve the goals and objectives of the project.

HQ USAF Innovation Center: Commonly referred to as the "The IC" it's the first group decision support facility built in the Pentagon. Dedicated on 14 June 1994, the Innovation Center services all Secretariat and Air Staff organizations. This room offers an environment that promotes collaborative thinking and group decision-making. Designed to enhance workgroup efficiency and productivity, its fifteen-participant collegiate C-shaped" table with recessed monitors allows each participant to see each other with unobstructed view. The IC maintains a variety of collaborative technologies to help a workgroup achieve its meeting goals. These software packages allow workgroups to generate, organize and evaluate large amounts of information in less time than it would take if the meeting were held in a traditional meeting environment. The IC also has process flowcharting software for workgroups involved with process improvement, and decision charting software that facilitates issue exploration.

Leadership And The Technology Factor

Dr Richard I. Lester

Dr Richard I. Lester is the Educational Advisor, Ira C. Eaker Center for Professional Development, Air University, Maxwell AFB AL.

Dr Lester has lectured at Air War College, Air Command and Staff College, Naval War College, and the Naval Post Graduate School. His lectures have taken him to Europe, Japan, Korea, and throughout the United States.

Dr Lester has served as Director of Curriculum and Evaluation at Air University's Institute of Professional Development; as Chief of Social Behavioral Science in the United States Armed forces Institute; and as an education officer with the Strategic Air Command and the US Air Forces in Europe. He has also served on the faculties of the University of Maryland, the University of Wisconsin, and Auburn University.

Dr Lester has studied at the University of London (UK) and completed his Ph.D. at the University of Manchester (UK).

Dr Lester is the executive editor of *Concepts for Air Force Leadership*.

Leadership And The Technology Factor

Abstract

Compelling and creative leadership is one of the most critical demands of our time. Our Air Force is made up of people, doctrine, organizations, weapons, and equipment. It is performance leadership, however, that brings these elements together and makes them work effectively. Leaders make things happen. They set the tone for everything we do. They make it easier for people to adapt to change, accept risk and uncertainty, and help others reach their full potential. This presentation, *"Leadership and the Technology Factor,"* emphasizes the Air Force's commitment to quality-inspired leadership, especially the new kind of leadership needed in the military community during these times of unprecedented technological growth and change in the workplace. Our objective in this session is to examine the latest thinking about the art of leadership in order to achieve a better understanding of the process, and to improve leadership effectiveness within the context of a quality "high tech" Air Force. Good leaders develop through a never ending process of self-study, education, training, innovation, and experience. This discussion is also intended to provide an analytical foundation for what you should be, know, and do to lead people in a quality and technology-based Air Force environment.

Air Force 2025

Col Joseph A. (Jae) Engelbrecht Jr.

Colonel Joseph A. (Jae) Engelbrecht Jr. is the Director of the Chief of Staff of the Air Force (CSAF)-directed *2025* study, Air University; and Professor of Conflict and Change, Air War College, Maxwell Air Force Base, Alabama. As *2025* Director, Colonel Engelbrecht manages a year long education program on the future and future U.S. security requirements; supervises the research of 250 faculty and student scholars; and coordinates with over 1500 experts in U.S. and foreign universities, laboratories, think tanks, and corporations.

Air Force 2025

Abstract

This insightful, forward-looking presentation will help prepare you to take the next steps in your quality program to prepare for tomorrow's challenges. You can imagine many futures. A vast array of plausible events could form the environment in which your organization must survive and prosper. How do you plan for all of the possibilities? How do you avoid being surprised and knocked off balance? Can you develop a strategy that avoids shock and surprise, and also permits you to shape your most desirable future? Col Engelbrecht will discuss a strategic planning technique known as "Alternate Futures" which the Air University *2025* study team used to help them envision an array of future worlds which would provide the United States with security challenges and opportunity in the 21st century. The *2025* study ultimately developed six alternate futures to assess the ability of the United States to achieve air and space dominance in the future. Col Engelbrecht will describe these futures and discuss how this method can help your organization compete successfully in a seemingly uncertain future.

Cultural Change
Organizational Development Through A Shared Vision

SSgt (Sel) Eric A. Brawner

SSgt (Sel) Eric A. Brawner is assigned to the 305th Component Repair Squadron, McGuire Air Force Base, New Jersey. He is currently quality advisor to the Squadron commander. He specializes in Strategic Planning, Customer Focus, Metrics and Measurements, and Shared Vision. He began the quality journey in 1991.

Cultural Change
Organizational Development Through A Shared Vision

Abstract

This workshop gives an understanding of the concept of Shared Vision and the fundamental tools for implementation.

We all desire to institutionalize quality in daily processes. Accomplishing this dictates a cultural change in our organizations. You are probably asking, "How can I make this happen?"

Here's something to think about...Most significant organizations never see 40 years of operation. In 1947, an organization was born. The defense industry was significantly inflated due to the war effort. Eight out of ten males in the United States had served in the military or were serving in some capacity. The Army Air Corps was effective...to a point. A metamorphosis occurred bringing you to the seat you are in right now. The metamorphosis, of course, was the development of the United States Air Force in September 1947. Change was made possible and spawned by a vision, a vision of a world class military air power, air power taking control of the unclaimed battle field in the air.

Almost fifty years later and we still have much of the same fundamental vision..."building the world's most respected air and space force." Does your success in the past, guarantee you success in the future? Hoarding power through information and the lack of communication resulted in the majority of our force losing sight of the big picture. HOW MUCH TIME DO WE HAVE LEFT? Shared Vision is the vehicle guaranteeing our success and making this real today... If you let it!

Quality Approach — The Right Start For A USA

Col David J. (Joe) Boyles

Col Boyles is the Quality Advisor for the Air Force Development Test Center. The colonel graduated from the Air Force Academy in 1970 and has an MS from the Air Force Institute of Technology. He has served as a navigator in the F-4 Phantom as well as a logistician in aircraft maintenance and supply. He has commanded a logistics group as well as four squadrons during his 26 year Air Force career.

Quality Approach — The Right Start For A USA

Abstract

Unit Self Assessments, based on the Quality Air Force criteria, are the most powerful tool an organization can employ to introduce systematic quality processes into meeting mission requirements. In so doing, the organization begins to align its mission with proven business concepts which allow the organization to complete its assigned responsibilities better, faster, cheaper. The core values and concepts which form the foundation of the criteria are the most compelling reason to use QAF as the organizational model for excellence. These values are the characteristics which comprise the best in organizational excellence; the criteria will drive the organization in this pursuit.

The greatest mistake an organization can make in undertaking this USA process is failing to articulate and document the Quality approach or strategy at the senior executive level. Frequently, leaders leave this task to subordinates, quality advisors, or consultants. Disaster is usually the outcome of this misguided approach. Only senior leaders have the understanding and, more importantly, perspective, to build the organization's Approach. The job of the USA team is to take the leaders' approach and evaluate it for deployment and results.

Hypothesis: Excellent organizations recognize that the Quality Approach is the sole prerogative and, more importantly, responsibility of senior *leadership. This task cannot be delegated.*

The Malcolm Baldrige National Quality Award criteria was first developed in 1987 as a result of Public Law 100-107. Since that initial approach, the criteria has continued to change and evolve as emphasis changes and we understand more of what it takes to build superior, quality-based organizations. Throughout this evolution, one constant thread has been the tri-themes of approach, deployment, and results. Approach is the strategy that the organization employs; deployment is how well this strategy is integrated into the organizational framework; and results are the outcomes we expect from well deployed, on-target strategies.

Action Workout - A Tool for Dramatic Improvement

Photo
Not
Available

Capt Eller (photo not available) is a Quality Advisor for Headquarters Air Combat Command. He is assigned to the Action Workout team where he has coached, coordinated, and facilitated four Action Workouts. He is also the Assistant Course Director for HQ ACC's STARS (Staff Training to Assure the Right Start) program and Lead Facilitator for the MAJCOM
Innovation Center.

MSgt Foote (photo not available) is a consultant for the Air Force Quality Institute. She holds a Master's in Management from Troy State University. She has received Action Workout training from HQ ACC and participated as a team member for a HQ AMC Action Workout. Prior to her assignment at Maxwell she spent several years as a Quality Advisor and Manpower Technician for the 16th Special Operations Wing at Hurlburt Field.

TSgt Vann is a consultant and trainer with the Air Force Quality Institute. She is a certified Master Instructor and has worked in developing and implementing Continuous Process Improvement. She has consulted with many organizations and is specializing in the Government Performance and Results Act, PL 103-62 and the National Performance Review. She has consulted to individuals, groups, and organizations on Quality principles and the development of human resources training for four years. TSgt Vann is attending Faulkner University to complete her degree in Human Resource Management. She is actively involved in community volunteer work, particularly with senior citizens. Other areas of interest include running, racquetball, and her new hobby is skiing.

Action Workout - A Tool for Dramatic Improvement

Abstract

Action Workouts (AWOs) are a rapid, concentrated, high-energy, team effort that makes dramatic productivity improvements in organizations. What Air Combat Command has blued and brought into the Air Force is now spreading across the commands. More and more units are stepping up and taking on the AWO challenge. As such, there are many success stories and lessons learned in the process. This workshop will start with a brief overview of AWOs, success stories and lessons learned, followed by a discussion of the future of AWOs and how our organizations can capitalize on this powerful tool.

Less Education, More Training

Team Biography

Captain Sean A. Harrington, Master Sergeant Steven K. Berry, and Staff Sergeant Paul M. Pinnick formed the team known as the Air Force Technical Applications Center Quality Improvement Office (AFTAC/QI) late in 1995. Together they assessed the current training methodology and devised an innovative approach to training based on customer requirements and systematic feedback. The innovation comes in the form of modular courseware, workshops, and on-site consultation sessions, all based upon measurable results.

In place of pure classroom instruction, the AFTAC/QI team goes to the workcenter and facilitates the implementation of QAF strategies, focusing on strategic planning for all levels of the organization, the continuous improvement process, communication skills, and most importantly, indicators of success (metrics) based upon current, validated customer requirements.

The team spends a large portion of its time in the various AFTAC workcenters performing active consultation, with classroom instruction provided only when requested by the customer. Thus the AFTAC/QI motto: "Less classroom instruction, more hands-on education and training through consultation services." Quality *does* happen, every day, in the U.S. Air Force. The team sees their job as helping AFTAC members structure and improve the work already being done to focus on leadership's long-term goals.

Less Education, More Training

Abstract

HQ AFTAC/QI has adopted an innovative approach towards QAF implementation. This approach is centered around the theme of **"Less education, more training!"** Several months ago we noticed organization personnel were tired of redundant education that focused on theoretical application of quality. Since our people have received the foundation training at almost all levels of PME, we're moving away from the classroom environment and focusing on training and consultation (many times taking place simultaneously). Although foundation training is still available on an as-needed basis, we've reformatted our training program into a block-style format. Individuals, teams, or offices can now select for themselves what they need; and get it when they need it. We can then take it to them. We're through with **telling them how** to do it...we're now **showing them how** to do it!

Bottom Line: What we've been able to do is to show people (E-1 through SES-1) that quality is simple business practice that they are already doing...it is already there. Only through direct consultation/training can you personalize quality and gain 100% buy-in.

Surveys
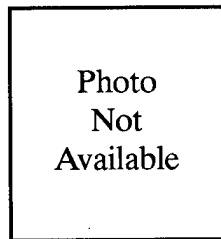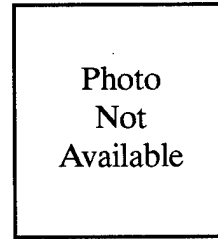
Photo Not Available	Photo Not Available
Maj (Sel) Charles Capps	Lt Col Leray L. Leber

Maj (Sel) Capps is currently working in the Performance Measures Flight, Directorate of Operations, at AFQI. Since arriving at the Institute in October 1995, his primary activities have included facilitation of the QAF reengineering working groups, organizational development consultations with the Undersecretary of the Air Force for Small Business Research (SAF/SB) and development of the AF Organizational Climate Survey.

After receiving a Bachelor of Science degree in psychology from the University of Alabama in 1981, Maj (Sel) Capps obtained a Master of Science in Clinical Psychology from Mississippi State University. Prior to entering the USAF in 1985 he served as the school psychologist at the Louisiana School of the Deaf in Baton Rouge, LA. Opportunities to conduct research and to consult with AF organizations led Maj (Sel) Capps' to enter the military. His first assignment was at the AF Human Resources Laboratory (AFHRL), Brooks AFB, TX. For three years he participated in the development of intelligent tutoring systems designed to facilitate training of AF personnel. Maj (Sel) Capps was named a Distinguished Graduate of Squadron Officer School in 1987 and upon his return to AFHRL, he served as the Executive Officer to the Commander.

In 1989, he joined the faculty of the US Air Force Academy in Colorado Springs, CO. Maj (Sel) Capps' duties included teaching, counseling in the Cadet Counseling and Leadership Center and conducting organizational consultation with squadrons both internal and external to the Academy. In 1992, he was offered an opportunity to return to school to complete his Ph.D. in Organizational Behavior at Michigan State University (MSU). While enrolled at MSU, Maj (Sel) Capps picked-up an additional Master's of Science degree in Human Resources Management and Labor and Industrial Relations. Maj (Sel) Capps has completed all of the required courses and passed the comprehensive exam stage of his program. He is currently writing his dissertation in the area of Organizational Climate.

Since 1994, Lt Col Leber has served as the Director of Quality and Assessment Division in the United States Air Force Academy's Office of Quality and Institutional Research. He graduated from USAFA in 1976, flew helicopter for 7 years, and holds MAs in Counseling, Human Relations, and Psychology and a PhD in Engineering Psychology. As an Associate Professor and Director of Quality and Assessment at the Academy, he has been privileged to instruct many great officer candidates, pursue numerous exciting improvement initiatives with senior Academy leadership, and work in a great Quality shop.

362

Surveys

Abstract

Common questions about surveys are re-enacted in a three-part drama. Act One, *"To Survey or Not to Survey- That is THE Question"* will focus on the preliminary work necessary to ensure you to choose the correct tools to accomplish your objectives. Participant actors will dramatize issues such as, outlining major areas to address in a survey, writing questions to represent major themes of strategic interest, deciding upon the appropriate numbers of questions, and working with senior leaders to ensure the survey captures actionable information. Act Two, *"What Can Go Wrong—Everything!"* will highlight some of the pitfalls you are almost guaranteed to experience when administering a survey. The actors will portray common pitfalls and examine ways to manage the survey process effectively, achieve acceptable response rates, preserve reliability and validity of the data and help with participants' concerns about anonymity. In Act Three, *"Data is the Means to the End-Improvement Based upon Feedback is the GOAL,"* the actors will discuss and illustrate how to provide data-based recommendations to commanders. The major theme will highlight ways in which consultants facilitate a move beyond simply looking at the results of the survey. Proper analytical processes, effective debriefs, and ensuring ownership of the data opens the door to a world of activity which can be aimed at improving organizations.

CyberGuard

Maj Gen Donald W. Shepperd

Major General Donald W. Shepperd is director of the Air National Guard, the Pentagon, Washington, D.C. He is responsible for formulating, developing and coordinating all policies, plans and programs affecting the more than 110,000 Air Guard members in more than 1,100 units throughout the United States, District of Columbia, Puerto Rico, Guam and the Virgin Islands.

The general graduated from the fourth class of the U.S. Air Force Academy in 1962. After receiving his wings, he was assigned to duty in West Germany and South Vietnam.

The general joined the Arizona Air National Guard in August 1974 where he held the positions of squadron commander; group deputy commander for operations and group vice commander. In January 1987 he transferred to the Massachusetts Air National Guard as the air commander of the 102nd Fighter Interceptor Wing. In July 1989 he was appointed as deputy director, Air National Guard, National Guard Bureau. A command pilot with more than 5,000 flying hours, he flew 247 fighter combat missions in Southeast Asia.

General Shepperd and his wife, Rose, have a son, Tyler.

CyberGuard

Change is the wave of the future. The Guard will change or die. How will we change in the future? *"CyberGuard"* is the term we have used to describe the Air National Guard of the 21st century. CyberGuard is not just computers and technology. CyberGuard is an organizational transformation for the 21st century - a new organization but one founded on our history and culture; a synergy of systems poised to accept new organizational structures, new missions, new processes, behaviors, and technology - it is the way we will work, train, live, and fight in a new world - AND an organization with shared vision and values.

We are investing in the infrastructure now. CyberGuard will be fiberoptically networked to the World Wide Web. We will be equipped with the latest computer systems and technology. Business will be conducted mainly through video-teleconferencing. Education and training will be accomplished through distance learning and often brought to the home. Work will be paperless. Decision-making will be prompt and deployed mainly through electronic means. Participation in decision-making will be increased by using town-meeting software and techniques. Staffs will be much smaller. Work will be done in team rooms, not functional areas. Computers will be voice-command and thought-controlled. Continuous simulation will be provided through distributed interactive simulation protocols and real-world scenarios will be provided in virtual reality helmets. There will be no administrative help. Everyone will be computer literate and the workforce will be composed of 40 percent minorities and women because that will be the workforce of America.

Technology will be a major driver of change. It will affect the how, what, when, where, and who does our jobs. We must have the wisdom and courage to accept new technology and new ways of doing business. The need for manned aerial platforms will significantly decrease. Miniaturization, computers, advanced communication methods, and the use of space will have profound effects on some of our traditional mission areas. The high-tech capability of our traditional Air Guard men and women will provide many opportunities for the Air Guard of the future.

Experiential Learning
(552 ACW Team Quality Challenge)

Capt W. Anthony "Mel" Tormey

Captain Tormey is currently the Deputy Director, 552 Operations Group Quality, Tinker AFB, Oklahoma. Duties include, but are not limited to, advising the Operations Group Commander on matters of Strategic Planning, QAFA preparation and Unit Self Assessment. In addition, Captain Tormey consults with squadron commanders and their quality advisors on action plans, Quality Performance Measures and quality training. He is certified to teach all levels of quality training within the 552 Air Control Wing. Captain Tormey is also a weapons director on board the E-3 AWACS.

Experiential Learning
(552 ACW Team Quality Challenge)

Abstract

The process of learning takes place through a variety of mediums books, tapes, lectures and from our own experiences. Team Quality Challenge is an experiential based program designed to promote and develop a wide range of critical team building skills. Putting existing teams into new and challenging situations provides opportunities for growth in basic communication skills, conflict management and problem solving. Team members learn the value of diversity and group dynamics as key elements of an effective team. The greatest amount of learning and retention takes place when we "experience" what it is we are attempting to learn. In this workshop you will see a demonstration of experiential learning, followed by a discussion of how it can be applied to your organization.

CHIEF OF STAFF
TEAM EXCELLENCE
AWARD
TEAM ABSTRACTS

Air Force Audit Agency Workpaper Automation Techniques
Air Force Audit Agency, Pentagon, Washington, DC

Abstract

The Air Force Audit Agency (AFAA) mission is to provide all levels of Air Force management with independent, objective, and quality audit services. The Agency is committed to continually training and developing its members and emphasizes improving audit skills with emerging technology advancements. Through the use of a process action team (PAT), the Agency has significantly impacted one of its critical processes (the field-level audit process) by utilizing innovative automated technology.

In April 1994, shortly after publishing its first Strategic Plan for Quality, the Agency chartered the Workpaper Automation Techniques PAT. In November 1995, the PAT completed informal tests of computerized forms and automation techniques the team developed. In March 1996, the Agency began the final test phase and preliminary implementation plan. The Agency estimates completing its overall training and implementation plan in March 1997, and expects its audit workpaper automation techniques to dramatically change the overall audit processes.

As computer technology evolved, the Agency provided its members valuable computer tools to prepare audit workpapers and write audit reports. Accordingly, auditors realized significant time savings and related improvements in those processes. However, the Agency also acknowledged the need to apply quality computer technology to improve audit processes. The system developed by the Workpaper Automation Techniques PAT automates many tasks previously done manually or were not standard throughout the Agency. Examples of these tasks include automated audit programs; automated cross-referencing; a standard format for responding to audit program questions with consolidation features; Agency forms and workpaper templates; audit program development guidance; and, on-line help.

As part of testing, the team estimated savings (both staff hours and cycle time) to be realized through implementation of its recommendations. The AFAA Quality Council adopted the team's recommendations and expects annual staff hour savings of approximately $1 million. Also, as reflected in the Agency's FY 1997 Performance Plan, use of the audit workpaper automation techniques will result in a five percent reduction in process cycle time.

That, coupled with other process enhancements, will offset projected man-power reductions and allow the same level of productivity.

The Agency's automated workpaper system will evolve as customer or auditor needs change. A future improvement may incorporate scanning audit evidence into automated files rather than copying the evidence into written workpapers. Another improvement may add voice recognition software, enabling auditors to talk rather than type their workpapers. The system provides auditors much needed quality technology improvements that will help provide improved customer services. As the Agency uses the automated system to its fullest extent, it will have virtually paperless audits.

A-10 Bombing Reliability Improvement Team Effort (BRITE Team)
355th Fighter Squadron, Eielson AFB, Alaska

Abstract

Background. The 355th Fighter Squadron, formerly the 355th Tactical Air Support Squadron (TASS), converted both primary mission aircraft and unit mission tasking in the late fall of 1994. In its role as a TASS, the unit's primary mission was one of serving as OA-10 Forward Air Controllers. When the unit received the A-10 aircraft, it was faced with the formidable challenge of becoming a full fledged fighter squadron with the primary mission of placing bombs on target, on time, and come home alive (BOTOTCHA).

Identify Improvement Opportunity. During the fall of 1994, the newly assigned squadron weapons officer, Capt T.R. Dunn, identified across-the-board poor bombing technique and scores, with a serious disconnect in pilot skill levels for arriving at the target in the right configuration and at the proper attack angle. These conditions are necessary in order to successfully ingress, deliver weapons, and escape the target area without becoming prey to self induced fragging or enemy defensive fire. Based on his review, Capt Dunn concluded that most, if not all, aircraft would have received damage during live weapons deliveries in wartime.

Squadron Commander, Lt Col Steve Courtoy was informed of this inadequate pilot performance and the overall adverse effect of deficiencies in unit bombing capability and accuracy. As process owner, Lt Col Courtoy noted that since BOTOTCHA is the bottom line objective of any combat fighter unit, immediate action would be required to identify root causes and develop solutions. Lt Col Courtoy chartered Major McDonough to attack the deficiency fix it. Major McDonough, in conjunction with Weapons and Tactics officers and the Unit Training officer, conducted extensive post mission film study to determine the extent and nature of the problem, with some root cause analysis directed at developing effective solutions.

Evaluate Process. In the initial effort for identification of the problem, data was gathered from bomb range scores, interviews with pilots and maintainers, tech order study, and both gun range camera film analyses. The initial group of team members discovered that in order to adequately deliver explosive ordnance on target, all four principle components of the A-10

weapon system must function properly: Correct pilot tactics and delivery techniques; Alignment of Heads Up Display (HUD) boresights; Inertial Navigation Unit (INU) alignment and accuracy; Weapon functioning properly upon release.

Increased Bomb Hit Rates + Increased Survivability
+ Increased Confidence in Delivery System
= INCREASED COMBAT CAPABILITY

The problem involved at least three components outside the scope of the pilots in the squadron and the team was expanded to include expertise from the maintenance and weapons communities. By February 1995 the team composition stabilized and the team set out to hone all four areas to get consistent, predictable performance from each airframe and pilot to ensure that the bombing reliability and accuracy would improve.

Analyze. Brainstorming and the five whys techniques were used to determine root causes for deficiencies found in the initial search of data and enabled the team to identify root causes, and develop recommendations and courses of action.

Pilots used highly inconsistent techniques to deliver weapons, often disregarding proven tactics and parameters, opting for That Looks About Right (TLAR) method of bombing. Evaluation of mission gun film and range Tactical Optical Scoring System (TOSS) scoring was extremely disappointing—Only 5 to 10% of all films viewed showed any attempts to correct to the wire and follow proper procedures. A concerted effort to establish proper habit patterns and air discipline on the part of the entire squadron pilot force was going to be required.

Boresighting of HUD units had not been performed since the aircraft were built with the result of significant permanent set and pipper variation. The combination of repeated G-loading through 15 to 20 years of operational use, as well as the extreme temperature cycles which aircraft are exposed to in the arctic environment resulted in severe alignment errors in the HUD boresights

Preflight alignment of the INUs was not eliminating all system bias, often resulting in significant "drifting" in the system, with resultant inaccuracy of the LASTE (Low Altitude Safety Targeting Enhancement) system. Tracking of INU systems was not accomplished on a regular basis. Aircrews only reported accuracy and drift errors when the system was operating clearly outside the established tech order standards. INU was aligned for only 8 minutes during preflight, which does not eliminate all bias in the system. The

average radial error rate for the unit INUs was 1.2 nautical miles per hour, with average velocity error of 7 to 8 feet per second.

Take Action. To correct pilot weapons delivery problems, an aggressive academic training program was initiated. This was combined with a highly visible film review process that enabled supervisors and commanders at all levels to be involved in instilling a new attitude and cultural value that demanded excellence on the part of every pilot in the squadron. To quote the guidance provided the pilots: "the 355th film review process is designed as an additional tool to enable pilots to learn why and how to achieve desired weapons delivery parameters. Desired weapons effects are only possible when on planned parameters. Achieving those parameters by evaluating and learning from our performance on a daily basis results in meeting our overall objective - KILL & SURVIVE."

Correcting the HUD boresight would prove to be more difficult. In order to properly align the boresight, a special purpose laser alignment tool was necessary. The maintenance members worked closely with AFETS to locate and procure the required tools and equipment. In order to allow adequate time for the boresighting to take place, the aircraft would need to be removed from the flying schedule. The Operations Officer empowered unit schedulers to coordinate with maintenance schedulers to modify the scheduling process that allowed adequate down time to perform the boresighting.

The plan for improving INU accuracy was another cross-functional team effort in which maintenance personnel and unit pilots used a partnering approach to gather data on a daily basis. This was used to refine both operations and maintenance practices to ensure the INU provided the most accurate information possible. Creation of an INU datasheet that was completed by each pilot on every mission, and adoption of a 16 minute INU alignment during the pilot's preflight would eliminate 100% of the system bias error. The additional creation of a "Meet the Jet" program with the Aircraft Footprinting program allowed the maintenance specialists to be brought into direct contact with the pilots after each mission to debrief INU problems and discuss ways to further improve system accuracy and reliability.

Finally, in an effort to continuously improve the system and permanently capture the benefits of the new approaches, the squadron created a maintenance liaison program in September of 1995. The maintenance liaison program is designed to improve communication and foster a close working relationship between operations and maintenance. This resulted in early identification of problems, effective solutions, increased squadron morale, and improved combat capability.

Study Results. All recommend corrective actions were approved for implementation by the process owner. After having them in place for three months, each area was revisited and data re-examined to determine impact on unit combat capability and bombing reliability.

Pilot performance showed a full 90% improvement with virtually all pilots in the unit now showing scores in the high 90% area on all precalculated/ planned parameters. These results were easily verified using TOSS and gun films, Turkey Shoot data, and Top Gun competitions.

HUD boresighting was highly successful as well, with all four aircraft having virtually all of the sighting error eliminated and returned to a true 0 mill deviation in the X and Y axis!

INU accuracy results were just as impressive. The squadron now has 100% tracking of INU data on all sorties. This data collection and feed back enabled system maintenance specialists to improve system accuracy, eliminate 100% of the bias error and reduce the radial error rate by 75%. The average drift rate for unit aircraft is now less than .3 nautical miles per hour and sometimes 0.0 nautical miles per hour, with velocity errors now less than 2.0 feet per second.

Bottom Line Results. BOTOTCHA is the universal standard for fighter units world-wide. The improvement efforts of the BRITE Team have served to rapidly move our unit combat capability and weapons delivery capability to being the best in the best Air Force in the world! The results of the 1995 Gunsmoke, the USAF worldwide Composite Force Competition, readily verify our claim. The impact of the 355th's systematic approach to improving combat capability is easily seen below in the A-10 MDS Competition results. The A-10's from the 355th were 21.5% more effective in accomplishing the mission than the next major competitor.

Unit	Total Points Awarded	Total Points Possible	Percentage Possible Points
355th FS	831.650	1250	66.532
104th FS	563.800	1250	45.104
47th FS	470.467	1250	37.637
354/7/8th FS	264.000	1250	21.120
70th FS	56.000	650	8.615

Wheel and Tire Tracking System (WATTS) 56 Equipment Maintenance Squadron, Luke AFB, Arizona

Abstract

The mission of the 56th Equipment Maintenance Squadron (EMS) is "dedicated professionals providing quality maintenance, services, and products to customers through superior effort, continuous training, and teamwork." The Wheel and Tire Element has excelled at doing just that. Our primary customers include seven F-16 fighter squadrons assigned to the 56th Fighter Wing (FW), as well as transient aircrews and aircraft. The Wheel and Tire Element provides over 850 nose and main landing gear wheel and tire assemblies for 188 assigned F-16 aircraft. Wheels are cycled through the shop and reissued to fighter squadron supply points at an average rate of 500 assemblies per month.

The Wheel and Tire Tracking System (WATTS) was established due to problems stemming from the inadvertent installation of the improper bearing in an F-16 wheel assembly. A natural working group was established to study, analyze, and improve the process. Bearing installation verification and wheel accountability was non-existent. Although mission requirements were being met, a serious breakdown in the process was evident. Had the wheel assembly with the improper bearing been installed on an aircraft, catastrophic results could have occurred. One assembly had already been identified with the wrong bearing. However, there was no process in place to determine if any other assemblies had the same problem, short of doing a time-consuming one-time inspection of all installed wheels. In addition, procedures were not in place to prevent a reoccurrence of the same problem.

The natural working group identified three key areas for improvement: (1) ensure proper bearing installation; (2) provide accountability for the installation of the bearing; and (3) develop positive tracking and control of assets. Improvement of these three processes in this order were essential to support the wing's flying mission, pilot safety, and reliable aircraft.

The group was empowered by the 56 EMS Maintenance Supervisor, with full support of the Commander, to utilize managerial and administrative functions and the leadership of the squadron Quality Council to expedite the seven-step improvement process as it pertained to wheel and tire assemblies. The team was given the decision-making power to establish a program on the

merits of their expertise in the field of F-16 aircraft maintenance. The team fully expected to attain 100 percent customer satisfaction while establishing a tracking system to reduce excessive man-hours spent inspecting assemblies. The team envisioned a system that would ensure measurement, personnel accountability, and correct bearing installation, thus making the possibility of a mishap or interruption of the flying mission virtually impossible. Through such a tracking system, assets could be located at any point during the entire life cycle of the wheel assembly.

A task-level flow chart was developed to define the process. A cause and effect diagram, along with group discussions were utilized to identify boundaries. Using these tools, the team determined that several factors were outside of their span of control, but with the use of the cause and effect diagram, the team concluded that these factors were not an issue in this process.

Historical records, attrition rates, monthly stock counts, quality evaluation results, and supply records were used to identify possible root causes. The process flow chart and cause and effect diagram were also used. The team contacted other F-16 bases to determine if they had undergone any similar process improvement in this area. However, the other bases contacted did not have the same or a similar problem, which was a limiting factor. The team also applied who, what, where, when, and why questions in targeting the root causes. They looked at each step of the process to determine who was involved, what they did, where they performed the actions, why the step was necessary, and when it occurred.

By using a cause and effect diagram, the team determined that the root cause of the problem was the non-verification of the correct bearing during installation. Verification of the part number is required by technical order at the time of wheel installation. Had this verification been accomplished, the wrong bearing would not have been installed. In addition, the element did not have a method of accounting for the individual who built each wheel assembly. Had such a method been in place, individual responsibility for each bearing installation would have existed.

The group came up with several solutions to this problem at hand. The group created an action matrix which concluded that a supervisory follow-up inspection was the team's best solution to the bearing verification problem. The supervisor could inspect the bearing at any point in the process after installation, keeping the process flowing without interrupting workers performing maintenance. The team also decided to add more inspection points to the follow-up inspection and look for critical items prior to tire inflation. If a supervisor discovered a discrepancy in the wheel assembly or bearing, it could be repaired prior to tire inflation, saving up to 12 hours of downtime required for a leak check after inflation. Items selected for the inspection

were those items most commonly identified as problems by the customer. By incorporating the inspection steps into an official, easy-to-use checklist, personnel were made immediately aware of all changes and revisions. Additionally, using a specific checklist, supervisors can accurately track defects and trends. Reports are tallied monthly, and workers are briefed on the results of the inspection, contributing to the solution of problems, and encouraging personnel to strive for continuous improvement.

The team determined that, since the wheel assemblies have serial numbers, accountability and tracking was within the boundaries of the process. The team also realized that a manual method for tracking 850 wheels would become cumbersome and time-consuming. A computer-generated data base was a possible answer; however, the problem of manually gathering data and inputting it into the data base still needed to be addressed. The development of a bar code tracking system which tied into the data base was the instrument the team decided to focus its energy on.

The team agreed on the bar code system as the most rapid and accurate way to gather and record data. By affixing a bar code label on each wheel assembly and coding it to the wheel serial number, an instantaneous method of collecting data was established. Once the data was collected using a laser scanner, the information was downloaded into a user-friendly data base on a personal computer. The data base was built using a common software program that was acquired by the Squadron Computer Manager. The scanner package was locally purchased.

The team accomplished more than it envisioned. The process was named the Wheel And Tire Tracking System (WATTS). The simplicity and speed of the scanner and versatility of the data base is remarkable. Customers no longer sign hand receipts and log books; a bar code label represents each squadron. As the customer needs a wheel, the technician scans the wheel's bar code and the location bar code, and the customer takes the wheel. Daily production counts are automatically tallied and can be printed in daily, monthly, or yearly reports. Management information such as number of wheels on hand, wheels on order, depot wheels, and supply point balances is automatically reported as required. Information about each wheel, such as the date it was built, employee number of the technician who built it, and the supervisor who inspected the work, is easily retrieved. Also, location of wheel throughout the process can be input and recalled immediately. Depot overhaul dates are automatically forecast up to 20 years in advance.

By examining metrics (control charts), the team was able to determine that defects on assembled wheels were reduced almost immediately by 50 percent, and continued to improve monthly. Within two months of the program's implementation, complete records of all wheels were stored in the

data base. Wheels on order in Base Supply were reduced to less than 10 per type of assembly, a situation that has rarely occurred in past years. Man-hours spent inventorying wheels were greatly reduced, and supervisors no longer had to report to work early to count on-hand wheels and hand-print a daily status slide. Customer issue time was cut in half, as the customer no longer had to sign log books. Since implementation of WATTS, no wheels have been returned to the shop because of a defect that was due to our shop's repair cycle.

Equating the intangible benefits is difficult. Considering the potential for damage to an aircraft by a defective wheel assembly, this factor alone stands out as a significant dollar savings. The tangible benefits are more easily measured:

- 20 percent fewer man-hours are spent documenting and reporting wheel status
- Customer waiting time has been reduced by 50 percent
- After the first three months of implementation, the defect rate decreased by 95 percent
- The customer benefits from this inspection by receiving an error free product
- The system provides for accurate tracking and wheel management
- Wheel status is immediately available upon demand
- The wheel forecast can anticipate supply point shortages up to 20 years in the future

The potential of this program is limitless. Complete and immediate accountability of assets can be accomplished for not only wheels but any traceable item. This team has only touched the surface of the possibilities of this program. The sense of ownership in this process has increased to a point where the workers are proud to put their signature on the end product. Our goal is to eventually stop using the supervisor inspection. Employees' pride of workmanship and "do it right the first time" attitude will eventually delete this layer of inspection. The team is still active, continually exploring all new avenues and expanding the scope of this program's application for continuous process improvement.

Coordinator: MSgt Raymond E. Vester
DSN: 896-6179
FAX: 896-4915

F-15CAircraft Phase Inspection Action Workout (AWO) 1st Fighter Wing, Langley AFB, Virgina

Abstract

The 1st Fighter Wing's (1 FW) mission statement, "America's First Team Setting the Standard in Air Supremacy," illustrates our commitment to being the best in every thing we do. To accomplish this mission requires highly trained professionals and operational equipment executing at absolute peak performance. With an F-15 average fleet age exceeding 15 years, and a resulting Mission Capable (MC) rate hovering around the command average of 83 percent, having the maximum "iron on the ramp" to prepare and execute for contingency operations is paramount.

Background: A 34-person, cross-functional team consisting of member's from the 1 FW, conducted the first-ever wing-level AWO on F-15C aircraft periodic phase inspection. Approval to conduct the AWO was granted by the 1 FW Quality Improvement Council on 3 Apr 96. The objective of the event was to streamline the Phase process and reduce the overall cycle time required to perform periodic phase inspections. Phase inspections are scheduled every 200 flying hours. Based on 20 sorties per month flying 1.37 hours per sortie, each aircraft enters Phase approximately every 7.3 months. Based on each aircraft flying 200 hours every 7.3 months, 21 aircraft per squadron, and 20 work days per month, to maintain a manageable Phase schedule, a jet needs to roll into phase every 6.95 work days or 125 hours. This equation defines customer's TAKT time (a German term used to define the "beat of the drum" or customer defined process length).

Problem / Solutions: Fiscal constraints and manpower reductions in the aircraft maintenance career field have forced some time compliance modifications and other maintenance-related functions to be accomplished during Phase. These additional requirements often extend the time required to get the jets back on the ramp. Streamlining the Phase process will enable the squadrons to complete the Phase earlier, accomplish all time-compliance inspections and modifications, and result in faster delivery of iron from ramp-to-ramp (the time the jet rolls in and out of Phase). This accomplishment will eventually drive MC rates up, Non-Mission Capable, Maintenance (NMCM) time down, and ultimately resulting in a healthier fleet.

AWO Objective: The AWO team's primary objective was to reduce the overall Phase cycle time from 6.88 work days, to below 5 days by streamlining the critical paths.

AWO Mechanics: Personnel from the1 FW Manpower Office, using manpower models, personal interviews, and historical data, calculated current cycle time for the Hourly Post Flight 2 (HPO) Periodic Phase Inspection to be 110 hours or 6.88 work days. Using PERT/CPM models to flow chart the 13-step Phase process, cycle times were calculated for Pre-phase/De-Paneling, Look/Fix, and Post-Look/Fix segments. A typical Phase uses 15 people working two, eight-hour shifts. Total manpower expended during a Phase was calculated to be 1,650 man-hours. PERT/CPM diagrams indicated the Look/Fix phase for Hydraulic Systems, Engines, and Wing/Center Fuselage as the areas in which to focus. On 22 Apr 96, an inbrief to the Wing senior leadership was given. Teams were formed using process owners (Phase Support), customers (fighter squadron maintenance personnel), and suppliers (Supply, Engine Shop, Sheet Metal, etc.). Three teams were initially generated to focus on Hydraulics, Engines, and APG (Wing/Center Fuselage). In addition to these areas, the team decided to examine supply-related issues, which generated the forth team. Approximately 20 hours of AWO academics (Just-in-Time training) was given to team members. Following the training, the team commenced data collecting on the processes to determine a baseline from which to measure results. The actual AWO event occurred 6-10 May, with a formal outbrief to the Wing Commander immediately preceding.

Hydraulic Team Results: Hydraulic phase inspection processes formed the longest portion of the three specific areas investigated by AWO teams meaning that this section was within the critical path of the phase inspection process. Five segments were analyzed: Power-On Checks; Look; Fix; Non-Procurable Hydraulic Line Acquisition; and Procurable Hydraulic Line Acquisition. The Power-On Check process reduced cycle time and man-hours by 40 percent and eliminated 93 percent of the distance traveled by procuring a TTU-205 Tester and other items for Phase Support, eliminating several trips to the fighter squadrons to obtain tools and equipment. A 33 percent reduction in cycle time and man-hours as well as a decrease of 29 percent in distance traveled, occurred in the Look phase. This was a results of using voice-activated micro-cassette recorders, saving the technician time during discrepancy documentation, and reorganizing the Look sequence. Reductions realized in the average Fix phase of the inspection decreased the original cycle time and man-hours by 26 percent. Distance traveled was reduced from 19,834 feet to 1,631 feet, a 92 percent reduction, simply by bench stocking hydraulic lines, re-sequencing work cards and their flow, and by identifying bad hydraulic lines using streamers (reduced the time required to find bad lines) during work hand-offs between shops or during shift changes. Cycle time and man-hours expended for acquiring a non-procurable (fabricated by Sheet Metal Shop) hydraulic line averaged 3:10 hours. Process modifications reduced this time by 36 percent to 2:03 hours. By pre-positioning several high-use lines in Bench Stock, significant savings (from 7,141 to 244 feet, a 97 percent savings) were realized in travel time and distance between the Phase Dock and Sheet Metal. The average queue/wait time

awaiting delivery of a manufactured line from the structural repair shop was 8:46 minutes. This time was not included in the AWO measured cycle time for this process since mechanics could normally work other areas of the phase inspection while awaiting hydraulic line manufacture. Pre-positioning of pre-manufactured lines will totally eliminate this wait time for commonly used hydraulic lines. Procurable line process time was also significantly reduced. A 25 percent reduction in cycle and process time decreased times from 1:39 to 1:15. Distance traveled by phase inspection technicians was reduced by 95 percent to only 136 feet. Like non-procurable lines, pre-positioning of commonly used lines was a major contributor to the reductions realized. In addition, delivery of hydraulic lines by Combat Oriented Supply Organization (COSO) personnel garnished savings across the board for nearly all procurable lines. This delivery action by members of COSO will not significantly increase their workload since most common procurable lines are already on-hand in the phase dock area. Delivery of lines not contained within the phase area can be incorporated into existing supply delivery runs.

Engine Team Results: Engine inspection processes represented the second longest path in the inspection cycle. Four segments of the engine inspection areas were analyzed. Look (inspection), Central Gearbox/Jet Fuel Start (CGB/JFS) removal; CGB/JFS installation; and Fix. Look was performed by a single technician working over 10 hours and traveling 5,682 feet. Reorganizing work areas, developing a central location for maintenance stands, procuring dedicated Phase equipment and tools, and re-sequencing the steps used to perform inspection items directly contributed to a 51 percent reduction in both cycle time and man-hours and reduced distance traveled by 90 percent. CGB/JFS removal was performed by two people in 4:36 hours traveling over 9,600 feet. Delivering the CGB/JFS to the Small Gas Shop for repair accounted for the majority of the distance traveled in this process. Reorganizing the work area, using a small cart for tools and technical orders (TO), developing internal checklists, and having parts delivered directly to the jet, resulted in a 70 percent reduction in cycle time and man-hours and reduced distance traveled by 91 percent. CGB /JFS installation experienced 74 percent reduction in installation time and an 88 percent decrease in man-hours while travel distance was reduced by 93 percent. The Fix phase eliminated 26 percent of the cycle time while eliminating over 70 percent of the distance traveled.

APG (Wing/Center Fuselage) Results: This team examined five sub-processes: Clean-Up/Set-up, Look, Fix, Shakedown, and 7-Level Inspection. Set-Up and Clean-Up applied to all areas of Phase Inspection and accounted for over 19 hours of non-value added work. By eliminating two redundant daily Foreign Object Damage (FOD) walks, and positioning FOD and Environmental Protection Agency (EPA) cleanup containers in the immediate work area, the team received a 61 percent reduction in cycle time and man-hours, and a 75 percent reduction in the distance traveled. The Look phase

re-sequenced Work Cards and designed inspection flow charts, producing 11 percent improvements in cycle time and man-hours while decreasing distance traveled by 50 percent. The Fix phase achieved a 30 percent reduction in cycle time and an 84 percent reduction in distance traveled by removing entrapped water in flight control surfaces at the aircraft rather than sending the part to the Sheet Metal Shop for repair. They also achieved gains by installing electrical power cord reels on the maintenance work stands. Shake-down, a re-verification of aircraft structure and systems integrity, is typically performed by Phase personnel prior to releasing the aircraft for 7-level technician and subsequent Quality Assurance inspection. By eliminating the redundant 7-Level Inspection and restructuring the work sequence, cycle time for this segment was streamlined by 53 percent and distance traveled was reduced by 41 percent.

Supply/Support Team: The fourth AWO team investigated Supply and Support issues. Every facet of Phase was directly impacted by supply issues and this team garnished significant savings. Four major issues were examined: Bench Stock; Technical Orders (TO) an Tools; Supply Delivery; and Supply Ordering. Team members investigated existing requirements and determined no regulatory requirement existed which mandated control of bench stock items by support section personnel. Discussion revealed support personnel could not prevent misuse or pilfering as is the common perception. The single biggest distance and time savings in the AWO event resulted by moving Bench stock, Phase Support, TO/Job Guides, and tools to a centralized area on the hangar floor where technicians could obtain their own items. This relocation eliminated support personnel cycle time, eliminated phase technician queue/wait time, and reduced technician travel distances.

FINAL RESULTS: Reducing or eliminating non-value added work and waste produced spectacular results. Pre-AWO cycle time for Phase was 110 hours or 6.88 work days. Using innovative thinking, process streamlining, and reorganizing the work environment resulted in a 38 percent reduction in the overall Phase cycle time. HPO 2 Phase cycle time is now 68.55 hours or 4.28 work days with a man-hour reduction that went from 1,650 to 1,027 man-hours. This AWO targeted 3 of the 13 sub-processes in the Phase Inspection cycle. The process owner now has 30 people trained who will be able to continue streamlining the Phase process. Although most fixes were immediate, the team established long-term objectives that will further refine the process. Fabrication of wing maintenance stands will contain panel racks, electrical and pneumatic sources, bench stock, and tools. All items to accomplish Phase will be located directly in the stands, further reducing travel time, distance, wasted motion, and virtually eliminating all set-up time. Estimated reductions will drive Phase cycle time to under 42 hours, a reduction of 62 percent. "Quick fixes" garnished from this AWO can easily be applied to any Phase Dock with little or no expenditures. Bringing support directly to the work force produces significant savings.

Air Force Institute of Technology Graduate Education Re-Engineering Study Team
Air Force Institute of Technology, Wright-Patterson AFB, Ohio

Abstract

The mission of the Air Force Institute of Technology is "to provide responsive, defense-focused graduate and continuing education, research, and consultation to improve Air Force and joint operational capability". The goal is to provide mission-ready graduates to our customers, the ultimate employers of our graduates. The students also form a primary customer base. A key process within this mission is to design the size and composition of the graduate faculty.

Since 1989, the United States Air Force has been undergoing revolutionary changes. By FY 99, the officer personnel totals will be reduced by 29% from the FY 89 level, while the AFSCs served by AFIT resident schools will decrease by 34%. By FY 95, the MS degree quotas for the Graduate School of Engineering (EN) and the Graduate School of Logistics and Acquisition Management (LA) had been reduced by 25% and 45%, respectively. Faced with the reality of decreased fully funded student quotas for graduate education programs, AFIT must adapt to these changes and determine the most effective way of conducting graduate education.

On 16 March 1996, Colonel Ronald D. Townsend, AFIT Commandant, initiated the study to determine the future size and scope of the graduate schools in AFIT to reflect the changing environment in the Air Force and to propose an implementation plan. The objective of the team was to review the identified processes and to determine the appropriate size and composition of the graduate schools which would improve efficiency. Efficiency would be measured using cost-per-student-man-year, overall cost reductions, and student/faculty ratios.

The team did not alter an existing process, but rather developed a process to define the optimum size and composition of the graduate education faculty. A model was developed to identify stable education requirements for the Air Force. The team then defined the proper balance of faculty and staff to meet those stable education requirements. Following are the six steps accomplished:

1. Determine the steady-state annual quota needed to sustain the inventory of officers essential to fill Air Force positions which require officers who possess specific advanced degrees. This study employed a linear programming formulation of a Markov decision model to identify the annual steady-state quotas.

2. In recognition that the AFIT resident schools are not the sole providers of all fully-funded Air Force degrees associated with the academic specialties we provide, we determined the historical percentage of fully-funded degrees accomplished in residence for each academic specialty. This percentage was then applied to the steady-state annual quotas to derive the steady-state annual resident quota.

3. Since the actual number of annual fully funded quotas is the product of a budget constrained process, it was necessary to forecast the total number of resident quotas which could be expected to be funded during the planning horizon for this study (FY 99 and beyond).

4. In a similar fashion, a projection was made of the 1999 Ph.D. student quotas for the AFIT residence school.

5. The next step was to determine the annual steady-state resident quotas for the specific academic specialties addressed in this study which combine to form the total projected quota. This study assumed that the *distribution*, by discipline, of steady-state resident quotas was constant. Therefore, if the unconstrained Markov decision model results indicate that a particular AAD code represents 10% of the total quota allocation, then this AAD code was allocated 10% of the total quotas.

6. Given the projected annual steady-state resident quotas the team determined the faculty required to effectively perform the missions of the resident graduate schools. It was assumed that a 6 course unit load (each unit equates to teaching one 4 quarter hour course) would be used to size the faculties. The 6 course unit load is presumed to provide each faculty member sufficient time to advise students, to conduct research and consultation, and for professional development. The team determined the courses which would be required to conduct the academic programs associated with each academic discipline.

Baseline indicators showed that cost-per-student-man-year had increased from $26,758 in FY 89 to $35,665 in FY 95. The proposed re-engineering action designed for the extrapolated FY 99 quota of 271 MS students and 27 Ph.D. students reflects a potential savings (after FY 99) of 42 manpower positions in the two graduate schools, and the following potential cost reductions:

a) Personnel cost reduction from $15.48M to $12.25M, producing $3.23M cost savings and increases the student/faculty ratio from 4.5 to 6.9 for the two schools.

b) Cost-per-student-man-year decreases from $35,665 to $23,612.

This method presumes that a new requirements based system (similar to our Markov decision model) for determining quotas will be established. However, quotas developed through such a process can be expected to produce quite different distributions from those developed using current methods. Consequently, the re-engineering will be implemented in two phases in order to maintain the ability to meet current quota levels while efforts continue to implement a stable requirements identification system. The first implementation phase, currently underway, saves 30 manpower positions immediately and results in the following potential cost reductions:

a) Personnel cost reduction from $15.48M to $13.11M, producing $2.37M cost savings and increases the student/faculty ratio from 4.5 to 6.4 for the two schools.

b) Cost-per-student-man-year decreases from $35,665 to $25,305.

Survey data from students, graduates, and supervisors of our graduates will continue to be monitored to determine whether the usual high quality of our programs is maintained. In addition, periodic evaluation by accrediting agencies are used to ensure that academic excellence is maintained, while academic program reviews are used to ensure we meet the requirements of our Air Force customers. Results of the study will allow AFIT to maintain past levels of excellence, while satisfying our customer requirements in a more efficient manner.

With the overwhelming success of the Graduate School Re-Engineering Team, a similar team was established to review the faculty/staff size and composition of the AFIT Professional Continuing Education (PCE) schools, the methodology serving as a template for future cost effectiveness studies. The methodology proved so successful in this analysis that it has become the

standard by which all organizations within AFIT will review the effectiveness and efficiency of their operations. Upon completion of the PCE review, it is anticipated that the staff agencies within AFIT will also perform a review.

The methodology employed by this team, in particular the Markov decision model for requirements determination, has the potential for a far wider implementation and impact for the Air Force at large. The methodology used to evaluate education requirements and adjust faculty size and composition has potential application within Air University and Air Education and Training Command for Professional Continuing Education and Technical Training. This would prove valuable in improving the efficiency of all Air Force education and training organizations.

AFIT also continues to work with its customers to improve the education requirements process and its ability to meet their requirements. AFMC is one of the primary customers of the AFIT graduate education programs, employing the bulk of graduates in the engineering, acquisition, and logistics fields. The AFIT Commandant briefed the AFMC Commander on the results of the study and the Markov model used to identify stable, long-term education requirements.

Two team members briefed representatives of the HQ AFMC staff (requirements, engineering, personnel, science and technology) on two occasions. AFMC has begun discussions with HQ AFPC (AFIT Liaison and Air Force Education Requirements Board representative), and is anticipating presentation to the AFERB itself. If adopted, stable long-term education requirements can be identified at the Air Force level for many education and training organizations.

In summary, not only will the results of this study team improve the efficiency of the AFIT graduate schools in the short term, the prospects for far reaching, long-term benefits for the Air Force at large are extremely bright.

Coordinator: Lt Col Dave Murphy
                            SN 785-5480
                            AX 986-7286

Precision Measurement Equipment Laboratory Natural Working Group
46th Component Repair Squadron, Eglin AFB, Florida

Abstract

Team:

The laboratory's Natural Working Group was composed of key supervisors from throughout the different sections of the laboratory to include upper management personnel. The team consisted of military and civilian personnel with a broad range of experience, education, and skills. All brought their own unique and versatile approach to quality initiatives.

Problem:

The laboratory had for years followed a single approach to workload reduction and customer satisfaction. This approach is the main stay of doing business throughout the Air Force PMEL community with little variance. Our laboratory's approach to doing business was firmly entrenched; a backlog of 350 to 600 was the accepted norm. Turnaround time for the customer varied from 12 days to 20 days depending on how and what external factors affected the laboratory on a daily basis. Managing equipment overdue calibration and getting the customers to meet their responsibility of bringing in this overdue equipment was also a challenge. Overdue equipment ranged anywhere from 300 to 700 units. We wanted to change our whole approach to doing business. We wanted to dramatically change our concept, but were limited in our efforts to change things. Most of all we wanted our people to buy in to this desire and change things for the better.

Background:

The Precision Measurement Equipment Laboratory at Eglin Air Force Base is the largest field PMEL in the Air Force. The primary mission of the laboratory is to calibrate and repair ground and aircraft support test equipment for six different Air Force Commands; Air Force Materiel Command, Air Combat Command, Air Education and Training Command, Air Warfare Command, Air Force Special Operations Command, and the Air Force Reserve. Support is also provided to the Navy, Army, Coast Guard, Federal Aviation Administration units, and numerous civilian contractors throughout the Southeastern United States. We calibrate and repair an inventory of over

21,000 units belonging to over 400 unique owning work centers. The laboratory provides routine and priority calibration service in support of high profile test missions and real time operational missions.

The laboratories throughout the Air Force monitor and control their workload on a system that only measures how long the units had been in the laboratory, working the oldest units first and the rest on nonstandard ad hoc policies that vary widely from lab to lab. This laboratory was operating in the same way. We developed metrics as the Air Force quality initiative took hold over the years. We were not sure what we were measuring or even looking for at times, so we trudged right along with no real goal or process improvement firmly in hand. We were really stuck in a rut and wanted to change the way we did business. We took what metrics we had developed and took a closer look at the data we were collecting and measuring. We noticed that over the years the output was able to keep up with the input. This critical finding pointed to two key revelations; first, the technicians were able to sustain a steady amount of output that some how matched the input; second, this led us to understand and realize that with a fresh approach and commitment to process improvements, we could actually reduce a heavy and stagnant backlog with an increase to production.

The structured calibration intervals given to units once calibrated determined when the unit comes back for calibration. This calibration interval was a major paradigm for us, we believed that we had no control or ability to affect this limiting factor. After careful examination we determined that this limiting factor was not really a limiting factor at all. We discovered that the laboratory's total workload of 21,000 units amounted to a daily average input regardless of the due dates and that this input was somehow being unconsciously or consciously matched closely by the technicians. With this newly discovered fact we knew then that our processes were the areas that would gain us the most in efficiencies and production. We decided to examine all of the laboratory's processes for potential improvements and requirements. The initiative was made easier by the fact that the lab is divided into sections by peculiar equipment calibration procedures. We tasked the section chiefs to examine their processes and determine what quality initiatives could be implemented to enhance production. Flight management also examined the laboratory's processes, but on a much larger scale. New metrics were developed that further revealed inefficiencies and cumbersome processes that hindered effective production.

From this finding we determined that our processes and management of these processes were the key areas to evaluate and measure for process improvements. The team utilized new and existing metrics to evaluate historical data and measure process initiatives for effectiveness. Each section of the laboratory participated; no areas were left unexamined.

Also examined for improvement was a large overdue backlog that averaged around 300 to 700 units on a monthly basis. This area was also thoroughly measured and evaluated. The Air Force standard for PMEL laboratories is to sustain a maximum of one percent of the existing inventory supported by the laboratory in an overdue calibration status.

Results:

Our process initiatives were simple. We focused attention on management of our processes and keyed on only process improvements that had a "value added effect" on the laboratory. We leveled our input, provided training for our customers, increased supervisor involvement, automated some of our calibration procedures, and added a root cause investigation procedure when process nonconformities are discovered. The following recaps a year long effort to "do business better and smarter" despite a growth in inventory.

Lab Status 31 January 1995 Vs 31 March 1996

Inventory:
1995: 20386
1996: 21510

Total Items in Maintenance:
1995: 1512
1996:   500

Items Overdue Calibration:
1995: 593
1996: 205

Items Awaiting Parts:
1995: 62
1996: 57

Workable Backlog:
1995: 964
1996:   95

Average Daily Output:
1995: 49
1996: 92

Backlog in Days:
1995: 13.61
1996:   1.13

Average Turnaround Time:
1995: 11.0 Days
1996:   5.3 Days

Items Over 5 days in Lab:
1995: 447
1996:   20

Conclusion:

Our efforts to reduce a large and stagnate backlog resulted in many dividends for the laboratory and our customers. We dramatically increased production and reduced cycle time while keeping a constant eye on our quality and customer satisfaction indicators. While our changes to processes were small, they had a remarkable impact on production. We are certain that our success will be enduring because we have institutionalized the process changes into our procedures.

Fuel Systems Repair Section Process Action Team 22nd Maintenance Squadron, McConnell AFB, Kansas

Abstract

The Fuel Systems Repair Section was officially chartered in November 1995. Statistically speaking, this was not a particularly good month for the Fuel Systems Repair Section or the 22nd Air Refueling Wing (ARW). The Non-Mission-Capable for Maintenance (NMCM) time (the time an aircraft sits idle awaiting maintenance) was the second highest it had been in the past 12 months and the Mission capability rate (the percentage of aircraft that are capable of completing missions assigned to the 22 ARW) was at 77.4 percent—7.6 percent below the AMC standard. A major contributor to NMCM time was the Fuel Systems Repair Section's maintenance. The wing's total NMCM time for November was 1,625.4 hours and 1,019, or 63 percent, of that time was due to fuel system discrepancies. At one point in November, there were six aircraft waiting to enter the Fuel Systems Repair Section. Most importantly, we heard our customer saying, "We are not happy with the product that you are giving us." Several interviews with flight-time production superintendents alerted us to a growing perception that our product was expected to have defects and this should be factored into scheduling.

This was totally unacceptable. We knew action was necessary to improve our customer's satisfaction and confidence level in the product we supplied them. We met first as a natural working group to address the problem. After much discussion, we agreed a cross-functional process action team would be the appropriate method to attack this problem. Our process owner had already come to this conclusion. We were commissioned as a cross-functional process action team in November 1995.

We were commissioned to reduce the releak/repeats in the Fuel Systems Repair Section by 50 percent. The established 50 percent goal was not arbitrary. It was fully substantiated by the histogram created from the previous 12 months of releak/repeat data. We had collected data from shop maintenance log books, G081, and the Logistics Group's Analysis Section. We derived that since 7 out of 12 months of data collected fell within the 0-3.2 range, we could run our process within this parameter. If we could eliminate the assignable causes in the months that were out-of-control (above 3.2), we could feasibly run under 3 releak/repeats per month.

We assembled the data collected on the releak/repeat problem. We then constructed a pareto chart of all the KC-135 components listed. This pareto chart showed us vividly that our greatest opportunity was to reduce fuel bladder cell releaks. A releak is when a cell is repaired, and, on the leak check, the aircraft leaks from the area repaired. Releaks were number one on our pareto chart numerically and were by far the most time consuming maintenance repair on the chart. We decided to use a technique called nested paretos, a process by which pareto charts are used to narrow a broad subject (such as "all the releak/repeats in the section") into a smaller, more focused area (such as "fuel bladder cell releaks"). This smaller more manageable data can be looked at as a mini-process for improvement. We took each of the twenty fuel bladder cell releaks and listed them together for review by the team. Through discussion, we categorized all fuel bladder cell releaks according to the leak origination area. This gave us our second pareto chart. This pareto chart showed us that the forward body "O" cell releaked more than any other cell, with a total of five releaks.

Due to the small number of releaks (five), a pareto chart was no longer needed to help us stratify the data. After close examination of these individual releaks, we found something totally unexpected. On each of the five releaking forward body "O" cells, it was discovered that the releak was repaired by replacing a different cell. In other words, each of the five forward body "O" cells were not the actual leaking cell as thought. We realized at this point, we needed to look at our troubleshooting policies and procedures. Our first step was to go back to our data and look at every fuel bladder cell releak closely. This showed an even greater disparity. We saw that 16 out of the 20 total fuel bladder cell releaks were troubleshot to the wrong cell originally. The wrong cell was replaced, and after a leak check failure, the correct leaking cell was found. The remaining four fuel bladder cell releaks came from cells that had been cut on installation. These cells had all been cut in the same month. We discovered that this was the month supply had changed fuel bladder cell manufacturers. The new cells coming to us from supply were much thinner and easier to handle, but much easier to cut as well.

With these new findings, we began working our way through a cause and effect diagram. We found three root causes to our fuel bladder cell releak problem. First, our cells were now thinner and required more caution and care during installation (to avoid cutting). Second, fuel leaks from the originating bladder cell and travels along the ribs of the aircraft into non-leaking cavities and out of the wrong fuel cells drain. Third, 67 percent of the Fuel Systems Repair Section holds only a 3-skill level in their AFSC. Some mistakes were made in o-ring removal and installation due to the following factors: low experience level, excessive deployments of our skilled

394

technicians, and our skilled technicians being spread thin due to a three shift operation. This left many 3-skill level technicians to complete fuel systems maintenance at home station.

We inserted these root causes into an evaluation sheet, and developed action plans and methods for achieving them. We moved swiftly through this portion and implemented these policy and procedure changes in early December 1995. The results since this implementation have been extraordinary. The Fuel Systems Repair Section has incurred only one fuel bladder cell releak in six months. At the time of the implementation, the section averaged 1.25 cell releaks per month. The section has averaged 0.2 cell releaks per month since December. Each cell releak costs the Air Force an average of $2,500 in man-hours alone to repair. It also reduces our mission capability. Since December, cell releaks have dropped an average of one per month (1.25 - 0.2). This is an average savings of $2,500 per month.

We have undertaken our second mini-process, to reduce overall releak/repeats in the Fuel Systems Repair Section. After going back to our original pareto chart, we selected our next greatest area of opportunity, fuel valves. They were our second largest opportunity area on the pareto chart, with ten valve repeats. A repeat is when maintenance has been performed on a component, and on the operational check, the component does not function properly. We again used the nested pareto chart technique and constructed a pareto chart of the ten individual valve repeats. This showed us six of the valve repeats were due to circuit breakers popping after a new valve was installed and four were due to valves leaking after installation. We chose to look at the largest problem area, which was circuit breakers popping after valve installation. Out of six electrical repeats, five were determined to be unserviceable valves and one was determined to have shorted wing. From here, we decided to construct a cause and effect diagram. We found three root causes from this diagram. First, we determined some valves may be issued unserviceable. Second, we determined that when troubleshooting a valve problem, most electricians only check for voltage. Valves must have amps and ohms to operate. The current troubleshooting procedures do not require an electrician to check for amps and ohms. We determined that these checks should be accomplished to isolate a bad valve. The root cause was that electricians are not trained to check for amps and ohms and there is not step in the technical order to accomplish these checks. Third, electrical checks are limited to external tank valves. Internal tank valves must be checked at a splice point, leaving the area between the splice point and the valve unchecked. Sometimes, this unchecked area is where the actual problem exists.

We have implemented an action plan to reduce valve repeats. We submitted a list of frequently used fuel valves to supply. These valves have be added to a functional checklist. When the valve is received on base from depot, the valve is sent to the electrical shop for an operational check. If the valve is found to be serviceable, it is then tagged and ready for issue to the Fuel Systems Repair Section. This will isolate any unserviceable valves that are received from our supplier. We implemented procedures to isolate the suspected bad valves on removal from the aircraft. We will do an operational check upon removal and make a determination on its serviceability. If this valve checks good, then we have a troubleshooting error. By isolating each part of the maintenance procedure, we will be able to determine if we have an unserviceable part or a troubleshooting error.

When the Fuels Systems Repair Section Process Action Team was chartered we were given the goal to reduce the releak/repeats in the section by 50 percent. This goal was exceeded and an 84 percent reduction was achieved. Our present rate of 0.2 releaks per month equates to many savings. It saves the base $2,503 per month in man-hour costs—$30,036 in the first year. It reduces Non-Mission-Capable for Maintenance time by 41 hours per month. This frees up 130 man-hours that can now be used for other maintenance actions. It increases aircraft availability by 492 hours per year—one additional airframe to fly for three weeks per year. It also increases our mission capability by 0.4 percent per month. The reduction in fuel bladder cell releaks is not the only savings achieved by the process action team. It was suggested that we could repair fuel bladder cells on base. After checking into this suggestion it was determined that fuel bladder cells are authorized repairable at field level. The potential savings from patching cells on base and turning them in serviceable are $147,000 in the first year. It will also potentially save 413 hours of Non-Mission-Capable for Supply time, which equates to one additional airframe to fly for 17 days and an increased mission capability of 0.3 percent per month. The 50 percent total releak/repeat reduction achieved (over and above fuel bladder cells) will pay back the base $32,648 in the first year. The total first year potential savings for the Fuel Systems Repair Section Process Action Team's improvements are over $210,000. Man-hour savings for the wing as of 30 June 1996 were $33,845 and two bladder cells have been repaired saving over $12,000 for a total savings of over $45,000 in pocket. Capability to repair fuel bladder cells has only been available for 30 days; savings from this process have just begun.

EC-130E/H Isochronal Inspection Section Action Workout Team
355th Equipment Maintenance Squadron, Davis-Monthan AFB, Arizona

Abstract

Team:

The Action Workout Team consisted of a cross-section of personnel from the Isochronal Inspection section, flying squadron maintenance units, backshop and support agencies. Each process improvement team consisted of a maximum of eight personnel. The wide range of experience and expertise aided immensely in the formulation of new ideas in efforts to maximize the overall process improvement potential.

Problem:

The 355th Wing currently has 21 EC-130E/H aircraft assigned to three flying squadrons. Each of them are required an annual isochronal inspection. The average time to complete an inspection ranged from 12 to 15 work days. Because of this, the aircraft usually overlapped by 3 to 5 days. Since each flying squadron was assigned an average of seven aircraft, the extended downtime severely impacted their mission capable rates and aircraft availability for home station training and deployment missions. With special mission aircraft and numerous deployment taskings, it was obvious that process improvement was a must.

Background:

The isochronal inspection is a technical order requirement that includes in-depth inspections for cracks, corrosion, structural integrity and operational checks of numerous aircraft systems and components. There are four different types of inspections categorized as minor and major. Minor inspections averaged 12 working days to complete and major inspections took an average of 15 working days. With an increase in the operations tempo, this extended downtime presented itself as a candidate for significant improvement.

Initially, squadron maintenance supervision formed a working group within Maintenance Flight to analyze the problem. The working group deployed crosstalk surveys to other C-130 bases. The surveys gained information concerning the unit's number of assigned aircraft, manpower authorizations, average duration of inspections, and quality initiatives. The following bases were contacted: Pope, Little Rock, Dyess, and Hurlburt. The working group found that the length of inspection was consistent with the other units. However, there were some improvement options gained through this avenue.

Wing senior leaders were briefed about the Action Workout concept during a commander's conference. The Operations and Logistics Group commanders both felt that this process could improve the concept of operations at Davis-Monthan. Because of this, they contacted the Air Combat Command Directorate of Quality to schedule the event.

Results:

The Action Workout (AWO) event proved beneficial in many ways. Numerous improvements in cycle times, expended man-hours, and the elimination of waste within the work center were documented. Each of the processes identified noteworthy improvements in those areas. For example, the Tools/Facilities/Equipment team found innovative ways to aid in the reduction of cycle times by 11.7 percent and man-hours by 14.5 percent, with a total savings in distance traveled of 16,280 feet. The results will aid the wing in efforts to produce mission capable aircraft more efficiently for training and deployment missions. A solid foundation was also laid for continuous process improvements.

Conclusion:

The Action Workout was considered an overall success. The tools passed on from this experience can be applied to all work centers. The best indicator of this is the teamwork fostered by using a cross-section of personnel—process owners, customers, suppliers and support personnel. Continuous process improvement is alive and well within the 355th Wing.

Fuel Conservation Process Action Team 189th Airlift Wing, Arkansas Air National Guard, Little Rock AFB, Arkansas

Abstract

Background

The 189th Airlift Wing, Arkansas Air National Guard, is a Department of Defense Formal Training Unit chartered to provide C-130 initial qualification, requalification, upgrade, and airland training. Trainees include pilots, navigators, flight engineers, and loadmasters from C-130 units of the United States Air Force, Air National Guard, Air Force Reserve, Marine Corps, Navy, Coast Guard, and foreign allies that fly the C-130 aircraft. Since 1986, the Wing has trained over 3000 aircrew members from 22 nations around the world. We have a highly experienced C-130 instructor force, possess 10 assigned aircraft, and fly approximately 5000 hours annually. Each year 160 pilots, 65 navigators, 50 flight engineers, and 65 loadmasters receive the best training available. The competition among the students to "fly with the Guard" is legendary.

In September 1993 we received the following directive from the Air National Guard Readiness Center (ANGRC):

The Air Force will decentralize aviation fuel funding effective 1 Oct 93. Avpol [Aviation Fuels] funding decentralization provides commanders fiduciary control over their aviation expenditures worldwide. Additional objectives are to:

A. Encourage management efficiencies to reduce fuel consumption.

B. Develop more accurate aircraft fuel consumption rates based on actual wing experience and flying profiles.

C. Increase financial flexibility in Operations and Maintenance (O & M) dollars from any savings accrued through conservation measures. However, the first priority for aviation fuel funding is still 100 percent preservation of training excellence necessary to assure tomorrow's combat capability.
(HQ USAF/LG MSG R291748Z SEP 93)

The bottom line — individual units would manage aviation fuel dollars. Units that conserved fuel would be able to convert excess funds to finance O & M projects. During the same time frame, budget cutting was a high priority in Congress and the Base Realignment and Closure Commission was working "the mother of all base closure lists."

Subsequently, the 189th Operations Group Quality Council began to research guidance on fuel conservation including an internal proposal from 1992 suggesting changing true airspeeds on overwater navigation training flights. The council soon determined that the evaluation of alternatives and the additional research required was beyond their scope.

Purpose

Based upon this ANGRC directive decentralizing aviation fuel funding and the prevailing climate of cost consciousness, the 189th Operations Group Quality Council chartered a Process Action Team (PAT) to investigate alternatives for conserving aviation fuel while maintaining quality student training.

Team Composition

The team was a cross-functional group composed of C-130 pilots, navigators, flight engineers, loadmasters, an aerial port specialist, a current operations specialist, a standardization/evaluation officer, and experienced maintenance personnel.

Methods for Team Success

We began by using recommendations consistent with the Joiner Team Handbook. We established ground rules and operating procedures. The team used a facilitator, team leader, recorder, and scribe. Agendas and minutes were kept and distributed. Additionally, the team garnered extensive information from suppliers, customers, process owners, and other specialized subject matter experts whose inputs were vital to the success of the PAT. The team used the six step problem solving process:

1) Identify and select the problem
2) Analyze the problem
3) Generate potential solutions
4) Select and plan the solution
5) Implement the solution
6) Evaluate the solution

The team leader gave the 189th Operations Group Commander, the process owner, monthly progress reviews and a final formal briefing on our findings and recommendations. Overcoming the "old-school" paradigms about how to analyze and solve problems was our greatest challenge and our greatest success.

We used the following tools to ensure that decisions were based on fact rather than opinion:

- Brainstorming
- Nominal Group Technique
- Affinity Diagrams
- Flow Charts
- Cause and Effect Diagrams
- Run Charts
- Decision Matrices

Action Plan

After a thorough examination of each possible solution, the team made the following recommendations which were approved for implementation by the 189th Operations Group Quality Council:

- Fly more fuel efficient airspeeds on all overwater navigation training flights.
- Fly optimal altitudes to transition bases.
- Fly optimal cruise profiles on airlift missions.
- Individually tailor ramp fuel loads for specific types of missions.
- Improve communication between aircrew and maintenance personnel to reduce maintenance engine run time.
- Develop a fuel conservation guide to consolidate fuel management techniques.
- Emphasize fuel conservation in formal student training.
- Put a metrics system in place for continuous tracking of fuel data.
- Provide a quarterly analysis of fuel usage to furnish feedback to the aircrews.

Actual Results

The Wing implemented the above recommendations on 3 January 1995. The team subsequently validated fuel conservation by comparing fuel consumption during calendar year 1995 to the baseline year of 1994. **We reduced our fuel consumption by 8.5 %.** This saved **249,200** gallons of aviation fuel, equivalent to **$189,392** calculated at the current fuel cost of $.76 per gallon.

If our active duty counterparts on Little Rock AFB implemented our action plan, the combined savings would exceed 686,000 gallons of fuel and $521,360 annually. If all C-130 units were to implement similar fuel conservation measures, the total savings to the Department of Defense would be measured in literally millions of taxpayers' dollars.

Impact on Key Processes and Performance Indicators

The pertinent key processes identified in the *189th Airlift Wing Quality Improvement Strategic Implementation Plan* were "Funding" and "Unit, Joint, and Allied Training." These key processes come from the key result areas of "Resource Management" and "Readiness and Sustainability." The team determined that an effective fuel conservation plan would result in significant cost savings to the 189th AW, a positive impact on "Funding." Through extensive analysis of student critiques, which is one of our key performance indicators, standardization/evaluation trend data, and customer surveys, we can prove that implementing our fuel conservation measures has not adversely impacted the quality of "Unit, Joint, and Allied Training."

Engine Management Process Action Team
353rd Maintenance Squadron, Kadena AB, Japan

Abstract

353d Maintenance Squadron (MXS) personifies Quality principles. The 353 MXS Engine Management Section identified an opportunity to improve the service life of propellers used by the 353d Special Operations Group (SOG). The existing process of propeller changes impacted the group with high cost, excessive man-hours in removals and installations, and a continuous lack of spares. The improved process resulted in a more reliable asset with more resources available for the fleet. The improved process directly contributes to the AFSOC goal and objective *1-3: Improve survivability, sustainability and reduce logistics signature.*

Engine Management Section contacted their key suppliers; 18th Supply (SUPS), 18th Transportation (TRANS) of Kadena AB and 374 MXS, 374 SUPS, and 374 TRANS of Yokota AB. The key customers, 1st Special Operations Squadron (SOS) and 17 SOS (flying squadrons of the 353 SOG), were also contacted to obtain a diverse set of ideas from different perspectives. Forging and strengthening partnerships between customers and suppliers, the 374 MXS, 374 SUPS, and 374 TRANS of Yokota AB, Japan, agreed to come to Kadena AB for a three day Process Action Team (PAT). The geographical separation and cost limited the time line to accomplish this PAT face to face.

The team reviewed documentation and identified significant factors leading to propeller changes. The PAT determined, by using the 7-step Continuous Improvement Process, the leading causes of propeller removals were leaking lip seals (28), followed by split blades (3) and burnt boots (2). The 353 SOG was averaging 3.2 propeller changes per month. The average propeller reliability was 1248.7 hours, well below the USAF standard of 4500 hours.

Using a process flowchart, the team identified their current procedures for servicing propellers:

1. Propeller breaks; the 353 MXS orders new propeller from 18 SUPS.
2. 353 MXS changes bad propeller.
3. 353 MXS turns bad propeller into 18 SUPS.
4. Propeller is shipped to 374 SUPS.

5. 374 SUPS receives bad propeller.
6. 374 SUPS turns bad propeller over to 374 MXS.
7. 374 MXS repairs propeller.
8. 374 MXS turns a serviceable propeller into 374 SUPS
9. Serviceable propeller is sent to 18 SUPS.

Upon reviewing the causes and current processing procedures, the 374 MXS advocated replacing the lip seals every time a propeller is put into maintenance. They also suggested placing every repaired propeller on the test cell for 1.5 hours (not a requirement by directive) and reviewing all maintenance procedures relating to the repair of propellers. The 374 MXS enthusiastically adopted these new procedures; they fully realized their initial maintenance time would increase, but the outcome would reduce maintenance actions in the future. The 353 MXS proposed and implemented a checklist to inspect all incoming propellers and reviewed all maintenance procedures relating to propeller changes.

The team revised the propeller servicing procedures (**F** designates change to process) in the following manner:

1. Propeller breaks; the 353 MXS orders new propeller from 18 SUPS.
2. 353 MXS Squadron inspects new propeller from 18 SUPS.
3. 353 MXS changes bad propeller.
4. 353 MXS turns bad propeller into 18 SUPS.
5. Propeller is shipped to 374 SUPS.
6. 374 SUPS receives bad propeller.
7. 374 SUPS turns bad propeller over to 374 MXS.
8. 374 MXS repairs propeller (to include changing lip seals whenever propeller comes into shop).
9. 374 MXS runs propeller on test cell for 1.5 hours.
10. 374 MXS turns a serviceable propeller into 374 SUPS.
11. Serviceable propeller is sent to 18 SUPS.

The Engine Management PAT fostered teamwork and open communication between customers and suppliers. The results of the PAT have been staggering. The process improvements enacted by the 353 MXS and 374 MXS slashed the number of required propeller changes by 63% (from 38 in 1994 to only 14 in 1995), saving the Air Force $3.6 million. The 353 SOG has now reduced it propeller change rate to only about a third of its 1994 average. The improvement process resulted in a more reliable asset, more spares for the fleet, and a safer product. If these changes have not already been adopted by other C-130 squadrons, we highly recommend them for adoption Air Force wide!

Team Peacekeeper (Guardian Work Out)
90th Missile Wing, F.E. Warren AFB, Wyoming

Abstract

OVERVIEW: The **mission** of Air Force Space Command (AFSPC) is to defend America through the control and exploitation of space. A primary **goal** of the command is to continuously improve the command's ability to provide and support combat forces for the warfighting CINCs. In support of one of AFSPC's primary customers, USSTRATCOM and its combat components, the 90 Missile Wing (MW) provides a ready, effective, and secure Intercontinental Ballistic Missile (ICBM) deterrent force. The 90 MW provides over 25 percent of USSTRATCOM's ICBM capability. The 90 MW, based at F.E. Warren AFB WY, operates the Peacekeeper missile system, providing long-range nuclear strike capability during wartime and force deterrence during peacetime.

PURPOSE: The AFSPC Quality Council chartered TEAM PEACE-KEEPER to improve Peacekeeper missile stage processing procedures. The AFSPC/CC approved the team as the first initiative under Guardian Work Out (GWO), the command's program to streamline and improve key MAJCOM operational processes. TEAM PEACEKEEPER was selected over other GWO candidates because of the significant role the Peacekeeper missile plays in support USSTRATCOM and our national ICBM strategy. The Peacekeeper missile consists of four stages; stage III was selected as the initial GWO to drive out waste and streamline missile maintenance processing. The team implemented improvements to stages I, II, and IV to enhance overall Peacekeeper missile stage processing effectiveness and increase ICBM combat surge capability in support of USSTRATCOM.

METHODS USED TO ACHIEVE TEAM SUCCESS: The team used the **7-Step Continuous Improvement Process (CIP)** and the **GWO methodology** to eliminate waste and achieve TEAM PEACEKEEPER success. In **Step 1 of the 7-Step CIP**, the team identified Stage III as its initial improvement opportunity. The team focused on the transportation of the stage from storage to the Missile Stage Processing Facility (MSPF) for maintenance processing, and transportation back into storage for shipment to the launch facility or off base (depot or launch from Vandenberg AFB). TEAM PEACEKEEPER used GWO as a systematic and intensified reengineering process to drive out waste in missile stage processing. The team's goal was to

achieve significant savings in stage-processing cycle time, man-hours, and the number of steps in the overall process. In **Step 2**, team members and advisors received training in QAF concepts, the 7-Step CIP, and GWO methodology to support overall team efforts. Team chiefs and facilitators also received process reengineering training with United Technologies Pratt and Whitney at its manufacturing facility in Hartford CT. After receiving training, the team baselined the missile staging process and set target improvement goals. The teams four target **goals for Stage III** were:

1. Reduce transportation steps 50 percent
2. Reduce stage processing steps 30 percent
3. Reduce transportation cycle time 75 percent
4. Reduce stage processing cycle time 50 percent

Team members were drawn from experts in the field of Peacekeeper missile maintenance, as well as from those who could provide a fresh outlook on the way we conduct business. Functional advisors from HQ AFSPC, and technical advisors from the 30 SW and 00-ALC and the 90 MW, as well as civilian contractors, augmented the team to ensure all the key players were assembled to support the GWO event. Process simplification and waste elimination were the primary objectives for the team.

Throughout the effort, the team applied techniques such as brainstorming, asking the five whys, repeating the process over and over, videotaping how the process is done, ensuring all team members had an equal voice, and trying out the improvements to see how they would work. From **Step 3**, in their analysis and evaluation of the current process, the team identified two root causes for the majority of the waste identified in Stage III:

1. Inefficient use of resources
2. Technical orders which required steps be taken that were either unnecessary or inefficient.

For **Step 4**, the team divided into functional groups to address these problems and to take action on any sideline issues that surfaced during the GWO. By eliminating non-value added steps in the process and modifying others, reallocating critical equipment, improving scheduling of resources, and adding visual controls as well as other changes, the team set the standard for missile stage processing. Each correction was initially proposed and subsequently tried ("trystorming") and refined to eliminate as much waste as possible. In **Step 5**, the long hours and intense work paid tremendous dividends in the team's results. In just three weeks, TEAM PEACEKEEPER achieved what had not been accomplished in the ten years of Peacekeeper

existence. The Stage III target goals, identified in Step 2, were met or exceeded in every instance as the results below depict:

STAGE III RESULTS: Goal	Before	Target	After	Actual Improvement
1. Transportation steps	68	50%	34	77%
2a. Staging steps, launch facility (LF)	47	30%	21	55 %
2b. Staging steps, depot	36	30%	18	50%
3. Transportation cycle time (hours)	19.1	75%	2.6	86%
4a. Stage cycle time, LF (hours)	7.4	50%	2.15	71%
4b. Stage cycle time, depot (hours)	4.65	50%	2.15	71%

Based on these Stage III results, the team proceeded to apply the same improvement methodology to Stages I, II, and IV and thus enhance the total Peacekeeper missile-stage processing effectiveness. The following chart depicts total improvement results for **Stages I, II, III, and IV:**

STAGE PROCESSING RESULTS: Goal	Before	After	Actual Improvement
1. Process Steps (for LF)	571	263	54%
2. Process Steps (for depot)	310	176	43%
3. Cycle Time (LF-hours)	132	41.5	69%
4. Cycle Time (depot-hours)	52.5	17	67%
5. Man-Hours (LF-hours)	616.5	197.5	68%
6. Man-Hours (depot-hours)	158.6	69	56%

The team activities and results in Step 5 correlated to overall improvements in the 90th Logistics Group (LG) key processes and performance indicators for missile stage turnaround. Total stage processing cycle time for the 90 LG went from seven to three days, a 68 percent reduction. As a result of this significant cycle-time reduction, the missile alert rate, a key performance indicator for the 90 MW and AFSPC, went from 98.5 percent to 99.3 percent. The ICBM "not mission capable" maintenance rate fell from 1.5 percent to less than .40 percent. The overall results from TEAM PEACEKEEPER significantly increased the 90 MW's ICBM surge capability and supported improved combat readiness for USSTRATCOM.

In **Step 6** as part of the team's standardization effort and with the support of the technical advisors from OO-ALC, 34 technical order changes were immediately approved. These changes standardized the revised procedures for all units performing these operations at the 90 MW, 30 SW, and the Ogden depot. Additionally, 18 follow-on technical order changes are being reviewed for follow-on implementation. Given the highly technical and strict oversight nature of ICBM maintenance, all Stage Processing personnel received on-the-job training and new technical order training before accomplishing the new procedures.

In **Step 7**, the calculated return on investment (ROI) for this effort is based on the man-hours saved and the capital investment with the acquisition of two salvage Type II transporters from depot; factored against the investment of man-hours, TDY costs, and equipment repair/renovation costs. The overall saving from this team's effort for the life of the Peacekeeper weapon system is almost $2 million. The resulting ROI for this effort is over $18.5 for each dollar invested. Future plans will consider application of these improvements to the missile recycle process for the entire fleet of 550 Minuteman IIIs in the ICBM inventory. The potential impact of these applications would enhance the surge capability for 100 percent of our nation's ICBM force. As a result of technical order changes generated by TEAM PEACEKEEPER, the Aerospace Guidance Metrology Center is developing a new technical order for pneumatic torque wrenches used in all maintenance across the Air Force.

Oxygen Shop Lean Logistics Team
Oklahoma City Air Logistics Center,
Tinker AFB, Oklahoma

Abstract

Purpose

In order to support the post cold war Air Force with a smaller, more efficient logistics system, the concept of Lean Logistics was established. Lean Logistics' concept is "faster, better, cheaper." Faster because we use express transportation to move items, better because we only repair what the customer needs, and cheaper because doing business this way requires less inventory. In essence, we are changing today's supply-based support structure, rich in inventory and expensive manpower, to a transportation-based support structure capitalizing on rapid movement throughout the logistics pipeline. Bottom line: it's a lot cheaper to use overnight transportation than buy five more parts to support the logistics pipeline. We will no longer buy, stock, and repair "just-in-case" inventories.

For depot repair, Lean Logistics means supplying the customers with what they need, when they need it, and in the quantities needed. A consolidated inventory of serviceable assets is maintained that covers variability in our repair processes and uncertainty in our customer's demand. A customer requirement releases a serviceable unit to him and a brings a repairable into depot maintenance repair. Supplies of repair parts to the depot also operate on a demand protocol.

AFMC's goal is to implement Lean Logistics within each of its shops by 1 January 1998. To achieve this goal, each AFMC center selected one shop in which to implement Lean Logistics. In October 1994, OC-ALC selected the Commodities Management Directorate's oxygen shop to prototype this initiative. Our oxygen shop is the only oxygen overhaul facility in the Air Force. This facility is used for the overhaul, test, and calibration of over 8000 critical life support items (oxygen breathing systems, converters, survival kits, and anti-g valves) for all types of aircraft in the Air Force inventory each year. We service oxygen converter repair processes as well as oxygen service carts which support transient and OC-ALC aircraft crew life support systems. The facility consists of specialized chemical cleaning systems, overhaul equipment, calibration equipment, and oxygen purging/filling systems. Our customers include all Air Force MAJCOMs with a flying mission, NATO Maintenance

and Supply Agency (NAMSA), Army, Navy, Marine Corps, Defense Logistics Agency (DLA), Federal Aviation Administration (FAA), Foreign Military Sales (FMS), and local base and depot supply.

Lean Logistics drastically changed the way the oxygen shop did their business. Previously, we negotiated our work requirements quarterly. Work requirements were based on historical data that computed how many items customers previously used each quarter. Supply would then ship the oxygen shop that number of items. There was no particular time frame for completing each item as long as our work was completed by the end of the next quarter. Lean Logistics changed all that. Under Lean Logistics, what we used to do four or five times a quarter, we would now do every day.

Methods for Success

Initially, there was much apprehension in the funding and requirements arena over the possibility of failing to successfully implement Lean Logistics. They had been supporting customer requirements using the traditional computations for some time. Having maintenance identify and repair on demand seemed to be an impossible task using our current systems. Additionally, production and maintenance support staff were concerned about dramatic changes to traditional requirement processes, our inability to react quickly to daily changes of repair demands, and the availability of skilled manpower to adapt to sharp increases and decreases in demand patterns. In October 1994, management pulled together 43 functional experts (oxygen shop mechanics, engineers, workloaders, production management specialists, an item management team, shop scheduler, financial analysts, planners, and a DLA representative) to form the Oxygen Shop Lean Logistics Team. Their mission—turn Lean Logistics from an impossible task into a doable reality.

The team's first task was to change the current method of calculating a repair requirement based on two years of historical data, to a way we could execute depot repair on exchangeables based on the Lean Logistics concepts (give the customer what he needs now rather than forecasting what he might need in the future). To this end, the team designed, tested, and implemented a new system, the Automated Induction System (ASIS), three short months after the need was determined. The team also established a consolidated serviceable inventory (CSI). The CSI, located at Tinker (the source of repair (SOR)), protected us from the uncertainly of customer demands and variances in the depot repair process, and allowed a rapid two-day distribution to the customer. The depot would restock those quantities as serviceables were shipped to our customers. Once the repair was completed, the Defense Logistics Agency (DLA) would then use express transportation to move

items from the repair shop and back to the customer without delay (the team's DLA representative accelerated agreements on asset movement issues).

The team next focused on how to reduce flow and repair times without sacrificing quality. They utilized an automated shop floor tracking system, the Air Force Two-level Integration System (ATLIS). ATLIS tracks flow days, identifies trends and bottlenecks, so improvements can be made as required. The team also designed a shop floor computer modeling process to determine changes in the production path and impacts of increased or decreased workload. Data pulled from available systems provided flow days and material cost. Charts were made and kept on the shop floor for visibility to each technician on improvements or areas of concern. The team also developed training material to train all employees involved.

Results

The oxygen shop's Lean Logistics program has been deemed a success, and our customers have never been happier. Prior to Lean Logistics, it took an average of 252 days to get the customer's requirement in and get their products out the door. With Lean Logistics, we meet our customer's needs in approximately 13 days, a decrease of 95%.

Every MAJCOM in the entire Air Force relies on the life support items repaired in our oxygen shop. Oxygen shop items have been considered problem items by the MAJCOMs because there were numerous MICAP (mission capability) hours (which indicates a grounded aircraft) and too many oxygen items in the critical item program (CIP). With Lean Logistics, we decreased MICAP hours 55% and CIP items 80%.

Simulation modeling software highlighted repair process areas where queue items could be eliminated or reduced, which resulted in lower batch size quantities and faster repair times. Shop flow is down 84% (56 days to 10). We issued project codes to identify shop needs and DLA transportation time (0% (20 days to 2).

We also realized a financial benefit with Lean Logistics. The change in our repair requirements produced tangible cost benefits of $2,024,407 in direct material savings.

The Oxygen Shop Lean Logistic Team's hard work during the last two years is vital to the successful implementation of Lean Logistics within the other 99 shops at Tinker as well as the other 4 Air Logistics Centers (ALCs). Our team's unique program (AIS), training, metrics, and lessons learned have

been shared with the other ALCs and are considered vital for the implementation of Lean Logistics throughout AFMC by January 1998. The team's efforts allowed OC-ALC to implement Lean Logistics in all exchangeable repair shops 1 Jul 96, 18 months ahead of schedule.

Perhaps our biggest success story lies with our shop workers. With Lean Logistics, what workers used to do maybe four or five times a quarter, they now do every day. In the old days, one person might do the same job for vies or six years. Today, an instrument worker might be overhauling a regulator one day and a liquid-oxygen converter the next. Work is assigned daily, which gives employees an opportunity to learn different jobs in the shop. If we happen to lose some people in retirement or separations, we don't have that really drastic, 'OOPS' "so and so" is gone and now we must get someone trained. Consequently, the 26 instrument workers in the oxygen shop have a new sense of excitement and responsibility about their work; they don't just stock warehouse supplies anymore. For them, Lean Logistics has been a definite motivator.

The stakes are high as we tackle improvements in our logistics processes under Lean Logistics. Each day of inventory requirements in the pipeline equates to $36 million. That's a lot of money which could be applied to other needs to ensure we remain the best Air Force in the world.

Isochronal/Refurbishment Quality Improvement Process Work Group
HQ 4th Air Force, McClellan AFB, California

Abstract

PURPOSE: We contracted with the Fourth Air Force Commander to increase aircraft availability and mission readiness through fact-based decisions to improve aircraft isochronal inspection and refurbishment processes. Fourth Air Force Logistics led and facilitated our unique working group. It had three teams organized by aircraft type, the C-5A, KC-135E/R, and C-141B. Teams members came from the 433 Airlift Wing, Kelly AFB, Texas, 452 Air Mobility Wing, March ARB, California, 507 Air Refueling Wing, Tinker AFB, Oklahoma, and the 940 Air Refueling Wing, McClellan AFB, California. The leadership visibility and support from the Fourth Air Force Commander and Logistics staff helped immensely with the "buy in" of each units leadership. True empowerment of the workers ensured participation and gave validity to this process improvement.

Twenty-five aircraft maintenance personnel from four different bases represented the three aircraft types. The communications, benchmarking and interchange of ideas between teams and knowledge between different types of aircraft maintenance practices proved invaluable to the workgroup as it matured and developed. This resulted in an unprecedented opportunity for improvement. Using a minimum of 280 workcards on the KC-135 to 575 on the C-5, 56 people work in the five Isochronal/Refurbishment (ISO) docks per day for over a month to complete one inspection. Reserve units normally work one shift during the week and one weekend each month. Everyone agreed the isochronal process took too long and needed to be studied by Fourth Air Force. We tried to "fix" the ISO process for years but none produced long term, sustained improvements. It was time for something to be done to improve the process.

METHODS: We selected a well-rounded team from ISO dock workers to supervisors. Then came a **contract** defining our objectives and ensuring commitment. A timeline for implementation was stated within the contract. A great deal of **team norming** and quality education within the group took place. Through facilitation from Fourth Air Force, we used the Air Force Reserve nine step Quality Improvement Process (QIP) modeled from Xerox. Thinking "out of the box" was encouraged for all team members.

We identified our customers and suppliers using brainwriting, list reduction, and defined them as internal or external through group consensus. **Customer requirements** were determined from surveys and interviews. They confirmed our ISO production did not meet our customers' needs. Our surveys asked the crew chief, "Who is your customer," to get any latent requirements from our second level customer (the aircrew). We interviewed them to get these requirements.

Through Pareto analysis we determined factors affecting aircraft availability. Programmed depot maintenance (PDM) was the largest, followed by isochronal inspections. We did not control PDM, so we began to look at the ISO for improvements. We developed a process map for the current isochronal process using the factors of time, people, percentage and cost. We further broke this down into the four-sub areas of predock, indock, post dock and fuel cell. We analyzed the largest time consumer and found many areas where the task consumed clock hours with limited impact on the process.

An example of this was on the C-141 where the tow in, maintenance stand positioning and depanel took six days (144 clock hours) and consumed 11.1 percent of the overall process. During this period, only five personnel were working on the process.

We continued looking at the process with the goal of reducing cycle time and discovered additional areas of ineffective time expended. The KC-135 aircraft ran engines prior to input into isochronal inspection. Benchmarking with the C-141B process, we studied the value- added of this process. We also used this tool on the fuel cell repair area. Both the KC-135 and C-5 performed fuel cell after the isochronal inspection while the C-141 did it before input. In studying these two areas for improvement, we looked for supporting data and found the C-141B reentered the fuel cell after the inspection to work on discrepancies found during the inspection. While the aircraft was isolated in the fuel cell, limited progress could be made on other ISO work. This consumed clock hours without being able to do other work.

The KC-135 predock engine run was evaluated in the same manner. Data showed that it had been done traditionally, consumed time, and identified few if any discrepancies for the past year. We studied the layouts of our facilities using the Dyess Air Force Base B-1B aircraft dock floor plan as a benchmark and found we needed similar facility improvements.

We continued in our search for time consuming items with these questions in mind: "Did it add value?" and, "Why?" We began to further analyze time consumption areas. The in-dock time has two major phases: The "look phase" using inspection workcards and the "fix phase" where discrepancies found during the "look phase" are corrected. The workcards have standard

timeframes. Why was it taking longer? We went to our internal suppliers (the maintenance back shops) and asked them to find out why.

We knew the maintenance back shops personnel are shared with the flightline generation squadrons. This is critical in the smaller shops such as Communications/Navigation, Pneudraulics and Electro/Environmental. Mechanics could not be in two places at once. They would just get started on the inspection and get called out to support a higher priority. Our team found that "manpower availability" affected the "look phase." The same problem occurred during the "fix phase." This was an interesting challenge since our customer, the crew chief, was being affected by back shop customers—the other crew chiefs. A negotiation took place between the Aircraft Generation Squadrons (AGS) and the isochronal docks concerning the scheduling of these shops so that both customers could be satisfied.

Gap analysis continued on other lost time areas, similar to fuel cell, when other work could not be performed. We identified Corrosion Control and Non-Destructive Inspection (NDI) as prime areas for improvements since isolation work areas are required. We found gaps in the processes where these two areas could be done, and not affect the process clock hours.

In summary, we reduced overall ISO time by standardizing fuel cell repair for all aircraft, adding manpower at key times to reduce clock hours, reducing the "look" and "fix" phase times, and eliminating pre-dock engine runs.Benchmarking with civilian aircraft companies, active duty wings and other guard and reserve units, revealed many excellent ideas. Sharing these ideas opened lines of communication for future benchmarking. At PEMCO, an aircraft repair facility, we found the need to more closely monitor the internal ISO process.

We developed a local checksheet, like they had, to track progress of individual tasks and deviations for future improvements. At Duncan Aviation, a Lear-Jet repair company, we found a bar code time collection method for job standards. We filed a request with HQ AFMC to test this on the C-5s at Kelly AFB, Texas, and believe this will result in over $1 million in annual savings, at Kelly AFB alone, in maintenance data collection.

Fishbone charts and **process maps** were used to identify key areas and gaps. Teams compiled different types of data and focused on the top five indicators. Our long term goals, per Secretary of Defense instructions, is to achieve a 50 percent reduction in cycle time by the year 2000. **Flow charting** helped us define tasks within the process and coordinate those tasks more effectively. This gave workers and supervisors a visual indication of improvements within that process and made the ISO inspection more controllable.

We have now determined the time required to accomplish an ISO/Refurb for each aircraft type by putting the process in control. This has proven helpful in scheduling as far as one year in advance. This forecasting enables us to maximize training and scheduled maintenance. Many of the improvements came from workers' suggestions who were more in touch with the inner workings of the process. Our storyboards provided a daily place for people to put these ideas. These ideas are now part of the new process and workers see firsthand that their voice counts and quality works.

RESULTS: While these only represent some of our improvements, many others took place. The end result is a streamlined well defined process, with the customer involved. Our charter challenged us to increase readiness and aircraft availability. The result of our process improvement effort has accomplished this with major results. This was a massive undertaking as we stated earlier. We met the challenge of geographic separation, three teams, and multiple aircraft to develop a standardized process, closely monitored, with our customer in mind.

This improvement resulted in an overall decrease of aircraft flow days through the ISO/Refurb hangar through June 1996 by 292 days for 24 completed inspections. This reduced the process by 33 percent and saved $1.9 million overall. We reduced aircraft flow from an average of 45.5 days to 22.7 for the C-141; to 19.5 for the C-5, and to 25.75 days for the KC-135. The flow has been consistently and slowly dropping. **Bottom line**, Fourth Air Force aircraft capabilities increased or exceeded customer requirements to meet the needs of global airlift for worldwide joint and coalition forces in peacetime or war per Air Force Doctrine.

The Chief of the Air Force Reserve recognized each team member at the Fourth Air Force Annual Commanders Conference. This recognition cascaded to the wing level and encouraged future participation. We continue working on future goals to improve even more. Our accomplishments as a team proves that quality done right, no matter what the scale, will lead to success. This process can be used throughout the Department of Defense (DOD) for all military services with aircraft hangar overhaul and repair activities. DOD wide, the potential savings is in the millions of dollars.

Small Computer Support Center Team Air Force Pentagon Communications Agency, Washington, DC

Abstract

Description

The Small Computer Support Center Team has aggressively improved its primary process: responding to small computer outages and repairing them quickly for 6,500 customers. Their new Systems Maintenance Active Response Team (SMART) program and reorganization into customer support teams, helped them reduce lengthy initial customer response times by a factor of five; from six days, to within 24 hours. Over half the calls received have maintenance actions started the same day they're called in. Over 40 percent of all calls are now fully repaired within 24-hours. The teams' initiatives had a direct impact on the Air Force Pentagon Communications Agency's mission to "provide and sustain standardized, integrated and innovative information technology products and services to the Pentagon community." This team is proof positive that government quality initiatives have a definite impact by improving customer service!

Process

As a participant in the Air Force Pentagon Communication Agency Commander's Quality Pilot Program in October 1994, the Small Computer Maintenance Team laid the groundwork for their initiatives. They identified customers and suppliers; identified and documented key processes; and developed training plans and team goals. The team consisted of every technician in the 18-member workcenter.

The team was experiencing a significant delay in getting to routine (first-in, first-out) personal computer maintenance calls. The average initial response time had gone from two work days to over six as indicated in the chart below:

SMOM Initial Response Times
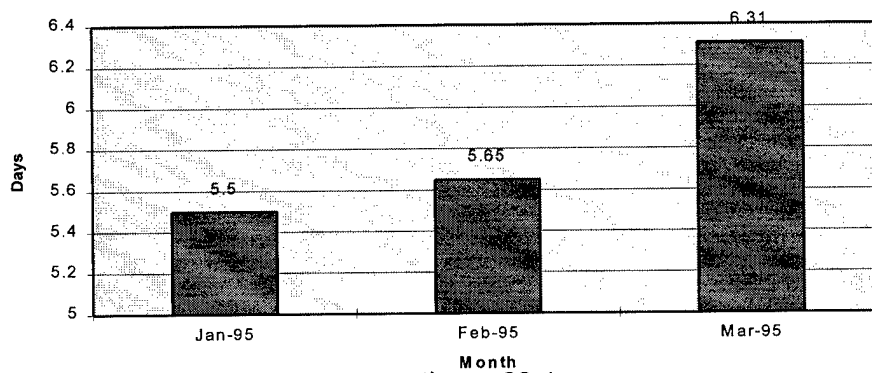
Figure 23-1

The majority of these delays were caused by the large number of calls opened each month and the significant number of jobs backlogged in their normal job queue; the situation was compounded by the loss of personnel with no replacements.

Obviously, customers were not pleased with these lengthy response times particularly if they had to wait six days for a 10-minute repair. In an attempt to improve response times, the team developed the Systems Maintenance Active Response Team (SMART) program.

The pilot program was started in April, 1995, and was monitored for the entire month. Metrics were collected throughout the period and were evaluated daily to determine positive or negative impact. The program "evolved" over time. Several procedural changes were implemented based on collected metrics and customer feedback. A detailed Concept of Operations document was developed and is reviewed quarterly to ensure consistent, repeatable processes. Daily technician meetings ensured any concerns, criticisms, and suggestions were openly discussed. During the same time period, the team decided to alter the way the workcenter was organized. Originally, the workcenter consisted of two separate areas: the Small Computer Technical Center (SCTC) and Client Administration.

The team initiated an effort to reorganize the workcenter to focus on improving our customer support. The original organizational structure was typical of traditional Air Force workcenters in that there were as many as four layers of supervision. The reorganization created three types of teams, each with a specific focus, and resulted in a flattened organization. This allowed them to concentrate on specific areas of their mission.

Throughout this period, senior leadership was enthusiastically supportive of the team's initiatives. Time for weekly quality meetings was authorized. Money was allocated for commercial team training. Team members were recognized through unit achievement awards.

Measurement

The team's primary objective for collecting metrics was simplicity with meaning. Based on customer feedback, the team focused on improving initial response times and reducing the number of backlogged calls. A simple checksheet was developed for technicians to record the number and type of jobs handled daily. Cumulative statistics were recorded in a spreadsheet making it easy to convey data to management and interpret program impact. Due to limitations of existing help desk software, an external program was written to extract backlog information from the help desk database. A special field was developed for the help desk software to track initial response times.

A customer feedback survey card was developed to determine the effectiveness of the team's programs from the customer's viewpoint. The survey is reviewed quarterly to ensure relevance to the team's customer focus.

Bar charts depicting average initial response times per month and the daily impact of the team's initiatives were developed. Pie charts indicating daily resolution rates were also created. All charts were reviewed weekly by the team and monthly by upper management Daily and monthly metrics reports, including graphs, were advertised and made available to customers through the team's Worldwide Web home page.

Result

The team's SMART program and concurrent reorganization into customer-focused teams has had a significant impact on operations and have markedly improved support to our 6,500 customers. Initial response times for routine customer outages decreased by a factor of five:

The average initial response time dropped from nearly six days, to within just 24 hours. Nearly 70 percent of all calls have a repair action started within 24 hours. Over 60 percent of all routine calls are now fully repaired within 24 hours.

Systems Maintenance Active Response Team Initial Response Times
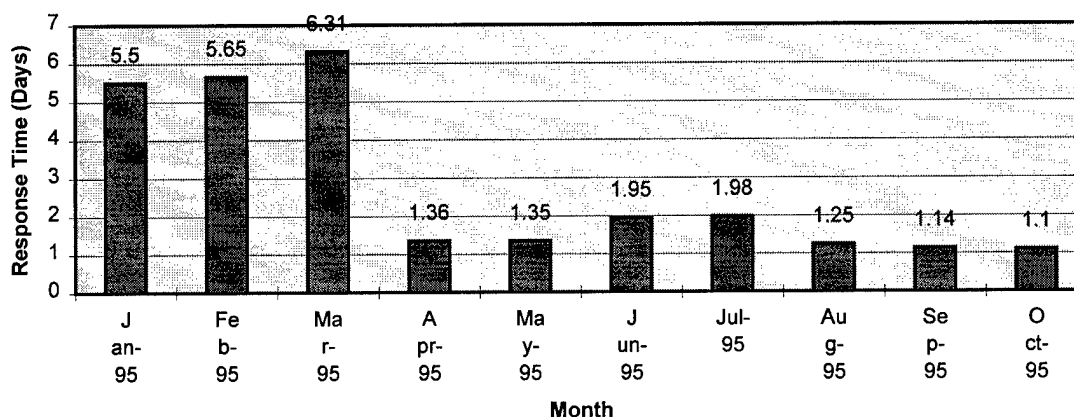
Figure 2

Morale within the workcenter has steadily improved. Technicians are more creative with the solutions they recommend for improving processes. All team members strive to live up to established expectations because they are continually involved in daily operations decisions through weekly team quality meetings. The removal of several layers of supervision within the organization has resulted in improved communications between technicians and managers.

The success this team has enjoyed has been the starting point for an expanded mission scope. The principles developed under SMART have been used to include support for Department of the Army staff offices. The lessons being learned from the SMART concept will be a cornerstone for the newly formed Single Agency Manager vision of one Agency providing information technology support for all branches of service in the Pentagon.

Our customers notice the difference. Verbal feedback and customer surveys reflect a 96 percent "highly satisfied" rating on the timeliness of our customer response. High-visibility customers who traditionally were disappointed with the team's responsiveness are now their advocates.

The Small Computer Maintenance Team has become the Agency's "quality success story." Their progress is constantly cited at the Agency's Quality Awareness training for newcomers. The storyboard the team developed has started other workcenters on the road to significant improvements in daily operations. They've quickly become the quality model for the Agency.

Other Information

The team has been publicly recognized for its remarkable efforts. In June, 1995, the team received the Air Force Pentagon Communications Agency's quarterly Customer Service Star Team Award. In August, 1995, the team received the Single Agency Manager Commander's Unit Achievement Award for continued outstanding support.

Accute Care Access Process Action Team
22nd Medical Group, McConnell AFB, Kansas

Abstract

Team's Purpose: The purpose of the 22 MDG Acute Care Access Process Action Team was to study and improve the access to acute care for beneficiaries of the 22d Medical Group at McConnell Air Force Base, Kansas. The team met regularly for one hour on Friday afternoons from 6 April 1995 to 14 June 1996.

Methods Used: A variety of methods were used to determine customer expectations and requirements, to identify the multiple facets of the actual acute care process, and to examine the relationships between the various facets.

Baseline indicator measurements included the DoD target point for acute care (appointment within 24 hours), the number of formal patient complaints surrounding access to acute care, the length of time the patient spent obtaining an acute care appointment, and patient satisfaction with access as reported on external surveys.

The team identified the requirements of the process owner through the stipulations outlined in the team charter. The requirements and expectations of the external customers (all eligible beneficiaries needing acute care) were determined by the use of a specially created survey. The results of this survey were presented as histograms. the results from the different areas of the clinic, Family practice and Flight Medicine, were examined separately to account for the differences in the beneficiary population served.

The next step was to flow chart the process of obtaining acute care, whether the patient called an entry point in the clinic (Acute Care Clinic, Central Appointments Desk, Family Practice or Flight Medicine Clinic, or the triage nurse) or walked in to an entry point within the facility (Acute Care Clinic, Family Practice or Flight Medicine Clinic, or the triage nurse). The exact steps of how a patient was handled at each entry point was identified and flow charted. As the team struggled with flow charting the process, related issues and concerns were kept in the parking lot for review as the team progressed.

Once everyone had an understanding of the process flow, a force field analysis was done to determine the driving and restraining forces to the team's goal, *Devise the optimal acute care (same day) access system so the appropriate patients are seen at the appropriate time and in appropriate location.* Through the use of brainstorming, all forces were listed. Because the team could not effectively address all driving and restraining forces, the team used nominal group technique to prioritize and identify the top three driving and top three restraining forces.

The team next used Ishikawa diagrams to map the factors and subfactors for each driving and restraining force. The team looked for the factors that occurred on several diagrams as probable root causes.

Throughout the life of the team, members contacted their counterparts at other facilities to gather information about how that medical facility operated its Acute Care Clinic, if they had a triage nurse system and lessons learned with the system, as well as the structure of their appointment system (who made what type of appointment). This information was translated into the pros and cons of the concept. This provided information to the rest of the team members for review prior to identifying recommendations.

The team, at least the team leader, frequently briefed the process owner to ensure the direction of the team was always forward and in keeping with the expectations of the process owner. All members of the team were actively encouraged to participate and share their expertise.

The team developed an action plan (a list of 24 recommendations) to present to the process owner and Executive Committee for review and approval. During the first presentation of the plan, 17 items were approved, 3 were disapproved, and 4 required more review and research by the team. the plan was presented two more times with the final approval of 19 items, final disapproval of 4 items, and 1 item still requiring additional review.

Each of the items approved were within the span of control of the team members and the team was empowered to execute those recommendations.

Results obtained: The team addressed all areas identified in the situation statement on its team charter and to date have accomplished 16 of the 19 approved recommendations. The effectiveness of several implemented strategies will be fully tested in the next several months, while the execution of several recommendations is on hold pending the implementation of the TRICARE contract in this region.

Identifiable trends since the institution of the team's recommendations are as follows:

- Formal complaints from patients related to access for acute care have decreased to 0.
- External satisfaction surveys (those that are mailed out to the beneficiaries) reflect an increase from 41% to 78% satisfied with access to care.
- Increase in anecdotal success stories, written and verbal testimonies, related to ease of obtaining acute care.
- Increase in the number of new patients to the facility expressing an understanding of how to access the facility for acute care.
- An increase in the number of patients who are able to identify, correctly, what team (Team 1, 2, 3, or FSO) to which they are empaneled.
- Improved access to acute care and triage appointments; no patients are being referred downtown for care because the limit of the acute care system had been reached.
- Increased satisfaction expressed by staff members.
- Fewer triage appointments are being filled, but there is an increase in the number of telephone consults for provider review (more patients are accepting advice as opposed to being scheduled for an appointment.
- Increased number of patients being triaged face-to-face by the nurse from 1-2 per day to 15-20 per day.

The process owner and members of the Executive Committee have directly attributed these positive trends to the recommendations implemented by the Acute Care Access Process Action Team.

Return on Investment: The team members, to date, have invested 396 hours to support the team's progress. During the work of the team, the members identified that the workload carried by the triage nurses in this facility preclude the need for 2 additional providers. At an AF projected value of #80,000 per provider per year, that is a cost savings of **$160,000**.

In addition, although the beneficiary population has remained stable, and more acute care appointments are left unfilled, CHAMPUS costs for this area have reduced $1.4 million dollars over one year. About 60% of this reduction is credited to an increased utilization of the services provided by the clinic, that is, patients have been recaptured into the Primary Care system. Of that 60%, an estimated half are the result of the changes implemented by the Acute Care Access team members which improved and re-directed the access of beneficiaries for acute care. This percentage is estimated as a cost-savings of **$420,000**.

424

Safety Process Action Team
512th Equipment Maintenance Squadron,
Dover AFB, Delaware

Abstract

A serious problem concerning an upward trend in reportable safety mishaps and first aid injuries within the 512th Equipment Maintenance Squadron came to a head during the fiscal year October 1993- September 1994. We had experienced 17 reportable and first aid accidents in a one year period. This was an alarming rate and management decided to tackle this problem utilizing Quality tools. The results was a reversal of this trend in a dramatic fashion.

A Process Action Team (PAT) was chartered and empowered by the squadron commander to identify the causes, develop solutions and to implement those solutions. Commander "buy in" was assured since the commander as a team member and process owner was involved as an observer and participant. The results of the team's efforts show a 77% reduction in accidents from September, 1994 through July, 1996(average of 4 per 12 month period versus 17) and a reduction in associated costs of 99.97% ($1200 versus $414,784).

Rivet Joint Human Factors Working Group
48th Medical Group, RAF Lakenheath, United Kingdom

Abstract

"Tomorrow is the most important thing in life. It comes to us at midnight very clean: it's perfect when it arrives and puts itself in our hands. It hopes we've learned something from yesterday."
- John Wayne

America has only three airborne aviation Air Intelligence Agency (AIA) units in the world. The mission of the AIA is "to serve as a combat force multiplier by providing vital information to theater, tactical, and national decision makers." In order for the 488th Intelligence Squadron (488 IS) to maintain it's mission readiness the 48th Medical Group (48 MDG) must supply them with healthy, mission ready personnel at all times. A grid coordinate off, or a transmission misunderstood could mean the difference between life or death in the air or on the ground. The RIVET JOINT Human Factors Working Group (RJHFWG), composed of personnel from a Forward Operating Agency (FOA), 3rd AF, and civilian research lab, came together in a joint effort to determine the factors that could affect the 488's ability to perform their vital missions.

The RJHFWG was formed in September 95 to study medical problems in the 488 IS RC-135 air crew personnel. It began as an ad hoc group of 488 IS and 48 Aerospace Medicine Squadron (48AMDS), part of the 48MDG, personnel who met to discuss the trends which indicated that 488 IS air crew personnel were experiencing a rate of medical problems well above local norms. What began as an ad hoc working group to study these upward trends soon began to uncover a myriad of opportunities to improve within the entire AIA and possibly had impact on other Air Force agencies.

The need for the first meetings was based on independent, and almost simultaneous, decisions by the 488 IS and the 48 MDG that the medical problems being experienced by the 488 IS air crew force warranted a closer examination. For the 488 IS, the need for this study centered around feedback from unit air crew members who expressed concerns about high levels of stress and fatigue experienced during RC-135 missions. During the same period, 48th MDG Flight Surgeon's office began to see a troubling pattern which indicated a significant number of 488 IS air crew members were being placed in duties not including flying (DNIF) status. In fact, preliminary unit DNIF data revealed that the 488 IS had the second highest DNIF rate of all

units in the United Kingdom — and more than double the local averages. In addition, the unit saw an increase in the number of unit personnel who sought assistance from the Royal Air Force (RAF) Lakenheath Mental Health Clinic. Many of these voluntary mental health "self-referrals" resulted in the individual going DNIF. This was further supported by the initial 48th MDG data which revealed that psychiatric-related illnesses were the second leading cause of unit DNIFs during September 95.

Since the unit's DNIF rate has a direct (and immediate) impact on the personnel available to carry out mission tasking, it is the critical factor in unit readiness. More importantly, however, the effect on the health of the RC-135 air crew force drives the long term viability of the overall RIVET JOINT mission.

This study is intricately linked to the operational mission of the 488 IS. Therefore, it maybe difficult to understand the reasons for, and the evolution of the study without an understanding of the impact of the associated operational environment. The beginning of this study corresponded with the aftermath of the increased operational tempo associated with Operation Deliberate Force airstrikes in the former Yugoslavia. However, although Deliberate Force represented the peak in operations tempo, it should not be viewed as the only or even primary cause. More accurately, it probably represents the cumulative effect of increased mission tasking probably going as far back as Operations Desert Storm, in August 1990.

What made Deliberate Force different than previous contingency tasking was the fact that it came at the end of five years of high operations tempo and competing requirements for the RC-135 crew force. This, coupled with a critical shortfall in linguists and critical crew positions, led to overtasking of a very limited crew force. These already critical shortfalls were compounded by the high unit DNIF rates which meant the remaining healthy crew members had to carry the weight of their fellow DNIF crew members. In addition, the military and political realities associated with Balkan military operations prevented optimum RIVET JOINT utilization. This , in turn , resulted in erratic mission tasking, extended times on station, and increased sortie rates which made effective air crew scheduling impossible.

Quote
"TDY rates are personally not a problem.
While TDY I get a chance to get back
into 'focus'...Nor is flying a problem—
it keeps me away from work."
- 488IS crew linguist

To provide focus for the study and to limit its scope, the RJHFWG members agreed that the ***primary goal was to identify causes of increased trends in DNIF rates, stress in the 488 IS and to recommend ways to reduce DNIF rates and stressors causing DNIF.*** A three phase approach was used to achieve these three goals. **Phase I (Sep 95 - Dec 95)** was spent gathering general information on the problem and developing the study. During the development of the study it was felt that breadth of data would be important to ensure validity and minimize bias. Therefore the study was designed to involve data from five independent areas: (1) Flight Reports by Medical Personnel, (2) Unit Mental Health Profile, (3) Surveys of Air Crews Members, (4) Chronogram Study, (5) Other data included DNIF rates, Fly hours and other operational information, Trip report from Dr. French and LtC Gorczynski, Pertinent Medical Articles, Listing of Disqualified Flyers over last 12 months, Ergonomics Study, and Marital Status Study. These five areas are often referred to as the five pillars of data. **Phase II** (Dec 95 - Feb 96) was the period dedicated to data collection on the five pillars. **Phase III** (Mar 96 - May 96) was analysis of the data and making recommendations, and putting into effect plans that could reduce DNIF rates.

The RIVET JOINT Human Factors Working Group is a landmark group that's led the first ever comprehensive medical review of human factors affecting stress on RC-135 air crews. Due to this group Operations JOINT ENDEAVOR tasking procedures were modified to reduce critical aircrew fatigue, Air Combat Command is updating Operating Instructions to reduce the crew duty day when supporting combat operations and the recommendations of the RJHFWG has already led to fundamental and far reaching changes in the way the RC-135's do business.

F-15 Egress Natural Working Group
18th Maintenance Squadron, Kadena AB, Japan

Abstract

1. Identify Improvement Opportunity

The 18th Wing's mission to "Defend US and allied interests by providing a responsive staging and operational air base with integrated, deployable, forward-based air power" places Kadena AB at the tip of the PACAF spear. The 18th Maintenance Squadron (MXS) is the largest of the 25 squadrons in the 18th Wing. The 18 MXS mission is "Provide reliable, specialized maintenance, and technical expertise for the 18th Wing flying units and DoD/Allied combat resources." The 18 MXS provides products and services to the 18th Operations Group and their assigned 64 F-15, 11 KC-135, 2 E-3A, and 9 HH-60 aircraft. The 18 MXS Egress Shop's main objective is to provide a reliable aircraft escape system on the F-15s.

The 18 MXS key processes are: (1) Aircraft System repair, (2) Aircraft System troubleshooting, and (3) Aircraft System Support and Delivery. The process selected for improvement was the Aircraft System Support and Delivery. A key component of Aircraft System Support and Delivery is the Time Change Item (TCI) management process. TCIs are explosive components that cause the seat to eject form the aircraft.

The egress shop believed the TCI management process was operating satisfactorily until a new superintendent arrived. The superintendent identified 1,896 inaccuracies in the TCI database. The superintendent presented these findings to the MXS Commander, who decided to charter a Natural Working Group (NWG) to improve the TCI management process. If not addressed, the PACAF standard of 83% F-15 aircraft mission capable rate could have fallen to 42% due to the potential groundhog of the entire F-15 fleet to conduct a full inventory of installed TCIs.

We identified internal customers as egress technicians and external customers as F-15 pilots, schedulers, and database managers. Suppliers are munitions operations technicians and Cartridge/Propellant Actuated Device (CAD/PAD) item managers.

2. Team Selection/Training/Maintenance/Empowerment/Facilitation

The team was selected by identifying the agencies that receive and utilize egress TCI data. Membership included personnel from the Egress Shop, Wing Database Management, Wing Plans, Scheduling and Documentation (PS&D), fighter squadron scheduling, and Munitions Operations. We initially held weekly 2-hour meetings and as we progressed we changed meetings to twice a month.

3. Evaluate and Analyze Initial Process and Identify Root Cause(s)

We completed a macro flowchart to identify process steps, boundaries, and wing agencies involved in the F-15 Egress TCI process.

After flowcharting, we used a cause and effect diagram to identify improvement opportunities. As we reviewed the results of the diagram, we noticed several commonalities. We used a table matrix to perform a force field analysis to define opportunities, results, and inhibiting and promoting forces. We then used a interrelationship diagraph (ID) to determine our top three priorities as: (1) mission impact, (2) parts optimization, and (3) CAMS/Database. We performed another ID and determined the CAMS/Database as our root cause due to its driving effect on mission impact and parts optimization.

After using various methods to determine customer satisfaction, we concluded the accuracy of the data contained in the TCI CAMS/Database determines the level of our customer satisfaction. The team gathered data on TCI CAMS/Database input errors and aggregated these errors into a pareto chart. The pareto confirmed that an inaccurate database was the indicator of customer satisfaction and the key to mission readiness. This common thread became the baseline criterion for performance growth.

All of our customers, excluding the pilots, require a 100% accurate database. The paretos measured the accuracy of the TCI items listed in the TCI CAMS/Database and the inaccuracies identified were in conflict with the customer requirement of a 100% accurate database. The CAMS/Database is used as an information tool for over 30 different work centers. Unfortunately, CAMS is not designed with edit restrictions to recognize and inform the user an error has occurred. Therefore, Egress technicians maintain manual source documents to ensure the egress components are removed as necessary. These manual records are used to update the CAMS/Database and are assumed to be correct because of the two-person concept for changing components. The Egress manual data system caused a gap between the customer requirement of a 100% accurate database and the actual process capability.

We developed a final opportunity statement: "An improvement opportunity exists to correct and validate the integrity of the Egress TCI management CAMS/Database to 100%. A further opportunity exists to standardize local training, decrease DIFMs, and parts overstock." This statement addressed the customer's requirement of an accurate database through the introduction of a validation process.

We completed another cause and effect diagram using the data in our table matrix. We used three affinitized priorities as the major branches of our cause and effect diagram. We then filled our branches with opportunities mapped our actions and led us to the target. The target became a 100% correction and validation of TCI Cams/Database, an 80% decrease in delinquent DIFMs, and a 50% reduction in parts overstock. After using various quality tools and techniques, we finally arrived at the root cause. The root cause was inaccuracies in the TCI CAMS/Database. With our target of 100% accuracy of this database in mind, we developed an action plan.

4. Take Action

As a team, we brainstormed our actions and their effects. We performed a feasibility analysis on cost benefits. Using a matrix table we reviewed our data to ensure we had taken every option into account. The results of the feasibility analysis proved the costs of implementing the action plan were well worth the efforts. The main action was the use of the Planning Requirements for Aircraft (PRA) 3 document. The PRA3 identifies errors in the manual records and CSAMS. The PR3 format lists information in the manufacturer's production order sequence; therefore, items not in a chronological order are identified as possible invalid data and can be researched to determine the necessary corrective action (see example).

PART #	LOT #	SERIAL #	D.O.M.
811318-6	MSV89H	B366	89334
811318-6	MSV89H	B398	92366*
811318-6	MSV89H	B487	89334

*Out of sequence date of manufacture (DOM) indicates possible error and is cause for grounding of aircraft.

The team determined that this validation method was the most cost effective and prevented a total aircraft inventory that would have grounded the fleet. This method quickly and logically enables detection of database input and at-the-aircraft errors. The group was able to correct all errors in the CAMS database and proceeded to identify and rectify all job site errors. The

team conducted on-the-job training and developed continuity books. The group also decided egress, PS&D, and munitions operations personnel should hold meetings twice a month to schedule aircraft for maintenance. This action provided scheduling efficiency for egress task accomplishment.

5. Assess Results and Demonstrate Causal Relationships

The improved process exceeded the expectations of our opportunity statement. We made corrections to the CAMS database without having to ground the entire fleet for an egress component inventory. The group achieved the following results in our baseline indicators: (1) We improved the CAMS egress component database accuracy from 24 percent to 100 percent, and we maintained a near zero job site and input error rate; (2) We reduced the 407% excess egress system component inventory to .5%; and (3) We reduced the delinquent DIFMs from 100 percent to 2 percent.

Correction of the database allowed schedulers to improve their forecasting through the group's validated data. In addition, munitions operations personnel were able to accurately requisition CAD/PAD parts from depot and reduce excess egress item inventory.

We also prevented a potential grounding of a valuable combat aircraft with a savings of over 4,500 man-hours equivalent to $187,241 in labor costs. Our results ensured increased reliability in the aircraft ejection system.

6. Standardize Solution

We sustained our improvement process by conducting training for key personnel in egress system TCI documentation in both manual records and the CAMS database. The training was correlated to tasks within the CAMS data entry, forecast report training, jobsite inspection, PRA1 & 3 interpretation, and parts management processes. We documented training in the AF Form 623 to ensure refresher training and time frames were properly managed. To ensure sustained improvement, we built continuity books to define the entire process of TCI information retrieval, documentation, and management. We revised the 18th Wing Maintenance Operating Instruction and detailed the production schedule and report format. This review ensures database accuracy and allows management to verify training effectiveness. Now, the superintendents monthly review of the PRA3 ensures error rates are kept below 1%.

7. Plan for the Future

The team contacted the egress training center to request standardization of instruction on CAMS TCI database input and the validation process. The team submitted an AF Form 1000 to change AFI 21-112, Time Change Management. This suggestion was taken into consideration in the development of Air Force Instruction 21-101 which includes detailed guidance for egress TCI data validation and management. The team also submitted an edit request to the CAMS C4 Systems Manager at Gunter Annex, Alabama. The edit request was implemented in June 1996, and edits of the CAMS TCI screens currently allow easy validation for TCI databases Air Force wide.

The F-15 Egress Natural Working Group continues to search for improvement opportunities in the TCI process.

Weapons Storage Area Security Enhancement 321st Security Police Squadron, Grand Forks AFB, North Dakota

Abstract

The MIGHTY GUARDIAN 94 exercise, at Ellsworth AFB SD and the subsequent report addressed critical areas in weapons storage area (WSA) security that could be improved to prevent loss, theft, or seizure of priority resources. As a result of this multiservice exercise, General Fogleman empowered all units with WSAs to find effective and affordable ways to address the problems identified in the report. A team from the 321 MG was formed to examine and correct potential problems within the WSA.

The 321st Missile Group Quality Council chartered a team of stockholders and experts from the 321st Missile Group and the 319th Air Refueling Wing. The major organizations to address these WSA security issues included 321 SPS, 79 RQF, 321 MG/SE, 321 MXS, 321 MG/FM, and 319 CES/CEO.

Step 1: Identify Improvement Opportunities.

The group commander, process action team, and facilitator used the results of Mighty Guardian 94 and a staff visit by HQ AFSPC/SP to identify key issues associated with WSA security. These issues were divided into near, mid, and long-term improvement opportunities. The team identified the process owner, customers, and suppliers for the processes involved with each issue. Near term issues were rapidly identified and processes revised with minimal investments in time, resources, and manpower. Backup force response time capability was identified as a major mid-term issue for improvement. Designing and fielding improved delay/denial barriers and installation of helicopter denial poles were identified as the leading long-term issues. The team used the nominal group technique and brainstorming to identify improvement opportunities.

Step 2: Team Selection/Training/Maintenance/Empowerment/Facilitation

The team was established based on the needs of the improvement opportunity and team members were selected based on overall expertise in WSA security operations. All members received PAT team training during early team formation. The team scheduled meetings regularly. Team member

losses were mitigated through the use of primaries and fully briefed alternates. The process owner, empowered the team to identify the best solutions and make recommendations. Team meetings proved very productive, requiring little in the way of facilitation beyond recommendations of appropriate tools to use.

Step 3: Evaluate and Analyze Initial Process and Identify Root Cause(s)

The team looked at WSA security enhancement based on near, mid, and long-term criteria. Near-term solutions to processes identified by the initial brainstorming sessions were rapidly implemented, leaving two remaining processes to focus on: backup force response time was seen as a mid-term issue, and delay/denial barrier implementation was seen as a long-term issue. Both became the primary focus of the team. Surveys identified significant problems of meeting backup force response time; four major factors were identified as contributing to this problem:

- Environment
- Procedures
- Equipment
- Personnel

A cause-and-effect diagram was used to identify root causes associated with backup force response problems. After identification of the problem's root causes, the team determined whether the problems were solvable and which had the greatest impact on improving response times.

We approached the delay/denial barrier issue differently, as it was a new process we had no benchmark for. After surveying other units, the team identified the best available options based on cost effectiveness, local conditions and terrain.

Step 4: Take Action

We addressed four areas for the backup force response process that the surveys revealed as problems:

- Individual Response: Training was conducted to teach personnel immediate response. Personnel were instructed to come-as-you-are in uniform. The backup force is now pre-identified by roster and is the first notification call made during a recall.

- Congested Response Location: Only the backup force responds to the armory. All other personnel respond to a second location.

- <u>Weapons Issue</u>: The backup force has pre-identified weapons they sign for on a roster and on-scene supervisors can vouch for personnel not on the roster to be armed. Additionally, more flight members are trained to issue weapons.

- <u>Vehicle Readiness</u>: Vehicles are held at-ready at the SPS vehicle control center and prioritized for backup force use. Pre-identified drivers pick them up before weapons issue at the armory.

We identified certain structures in the WSA as primary facilities for the delay/denial barriers. The team designed the King Tut blocks and installed them in front of structure doors to assess their effectiveness in delaying/ denying access to potential adversaries—they worked great! We are in the process of contracting out the installation of helicopter denial poles; their installation will be a one-time project that will reap great security benefits. Expected completion for the helicopter denial poles and King Tut blocks is the fall 1996.

Step 5: Assess Results and Demonstrate Causal Relationships

We conducted three exercises to assess backup force procedural changes. The response time was significantly less than the MAJCOM standard. We increased our response time 52 percent; a truly incredible increase.

Additionally, the new King Tut blocks have added significant delay/denial time for entry into WSA structures. While their effectiveness under hostile conditions has not been operationally tested by DSWA, computer simulation has verified we successfully met our target and increased overall delay/denial time 117 percent under ideal conditions—conditions a hostile force would be unable to duplicate.

Step 6: Standardize Solution

Here are the new standardized procedures for the backup force:

- Upon recall initiation, the backup force is notified first. Most members respond directly to the armory, as they are, in uniform. On-scene supervisors ensure responding personnel are rapidly armed and briefed on the situation. Four designated drivers respond directly to the vehicle control center to pick up armored vehicles and bring them to the armory. Upon arrival at the armory, the four drivers are armed and briefed. The entire backup force is dispatched as a team to the WSA.

- The old 19-step process in now streamlined to 14 steps, and we have increased our response time by 52 percent.

- We have integrated the procedures into base, group, and squadron operational plans, instructions, recall procedures, and training scenarios.

Procedures for use of the blocks in front of the WSA structures have been integrated into maintenance operating instructions, making them a routine element of operations in the area.

Step 7: Plan for the Future

We are continuing the process of installing the delay/denial barriers, building more blocks and installing the helicopter denial poles. The process action team has also identified two additional processes of WSA security they can deal with to enhance security; they are in the process of obtaining data to start the seven-step cycle on these issues.

CONCLUSION: We've taken a quality approach to enhance WSA security. Our new probability of success due to the process action team is now 99 percent, a 62 percent increase in our win factor against a hostile force from our pre-PAT state of readiness.

Index

*Presented at the Symposium.

*Presented at the Symposium.

SPECIAL EVENTS

CHIEF OF STAFF TEAM EXCELLENCE AWARD TEAM ABSTRACTS

Presented at the Symposium.